The Canadian Medical Association Journal

APRIL, 1954 • VOL. 70, NO. 4

INTERNAL MAMMARY ARTERY IMPLANT IN THE TREATMENT OF ANGINA PECTORIS: A THREE YEAR FOLLOW UP*

ARTHUR VINEBERG, M.D., *Montreal*

IN 1946, 1947, AND AGAIN IN 1951,[1, 2, 3] we reported in this Journal experimental evidence suggesting that it was possible to graft a third artery into the left ventricle and have it function in coronary artery insufficiency. Since our last report in this Journal many points have been clarified and the technique of implant has been greatly improved. It is now 3½ years since our first patient was operated upon, and three years since our first surviving patient underwent operation.

A short review of experimental evidence will be given and a summary of our experience with 12 patients with coronary artery insufficiency, all of whom have undergone internal mammary artery implant in the past 3½ years.

At this juncture let us consider two important questions: *First*—Just how necessary is surgery in the treatment of coronary artery insufficiency? *Second*—What experimental evidence is needed before a procedure can justifiably be used on human beings?

A review of published statistics concerning the longevity and disability of patients with coronary artery insufficiency is most enlightening and most definitely disturbing. There is no question that every physician knows of cases that have lived many years with angina pectoris. However, an analysis of the average longevity in a series of cases throws a different light on this question.

In Table I, the longevity of patients suffering from angina pectoris is shown for a group of 5,027 cases, reported in the recent literature. The average span of life in all cases is well under 8 years and, as Parker *et al.* and Bruck *et al.*, who have reported the largest number of cases, point out, is probably 5 years. The figures quoted refer to angina pectoris, without consideration of the presence or absence of coronary thrombosis with infarction.

TABLE I.

PROGNOSIS WITH ANGINA PECTORIS

Author	*Number of patients with angina pectoris*	*Average longevity (years)*
Herrick & Nuzun, 1918[4]	200	3.0
MacKenzie, 1923[5].....	380	5.4 dead group
White, 1926[6].....	200	3.4 dead group
White *et al*, 1931[7].....	500 followed 2 to 3	7.9
White *et al*, 1933[8].....	years: 445 dead; 52 alive.	18.4
Eppinger & Levine, 1934[9]	141 fatal cases	4.5 average
Wedd & Smith, 1935[10]...	166 fatal cases	5.8 average
Parker *et al*, 1946[11].....	3440 Mayo Clinic study	5.0 entire group
Bruck, W. J., Crumpacka, E. L.[11a] Dry, T. J., & Gage, R.P.....	5766 patients followed 5 to 23 yrs.	15% dead end 1st year; 9% dead each year thereafter. Avge. 5 year survival 58.4% entire group (Normal pop. 86.9%). Avge. 10 years entire series 37.1% (Normal pop. 70.4%).

In Table II is shown longevity after the first attack of coronary occlusion. The patients quoted by Conner and Holt, and Levine and Rosenbaum, may not have had the benefit of modern cardiological methods of diagnosis. This, however, cannot be said of those quoted by Katz *et al.* (see Table III) and Sigler. Although 81.5% of Sigler's patients (females) and 83.1% (males) were alive at the end of the second year, only 45.3% of the males and 39.8% of the females were alive at the end of the fifth year. These figures have been taken from a rather large source of 1,208 cases very carefully studied, and cannot be minimized. Katz *et al.*, reporting 488 cases with infarction show a much more serious picture. He reports that 25% of his cases were dead at the end of two months, 59%

*From the Departments of Experimental Surgery, McGill University, and of Surgery, Royal Victoria Hospital, Montreal, Canada.

at the end of one year, and 75% at the end of three years.

In Table III is shown the longevity in a series of cases that have had coronary artery occlusion with infarction.

Now that we have discussed longevity in percentages, let us consider the ability of those who survive to work. There is no doubt that patients survive coronary artery occlusion with infarction, but what kind of lives do they lead; how many are capable of working and, if they are working, how many of them are symptom free? According to Friedberg,[18] about 53% return to work, but of these only 32% are able to work full time and 21% part time. Thus, when we speak of approximately 50% 5-year survivals after coronary occlusion with infarction, one does not consider how many of these people who survived are useful citizens. In a general study of statistics one is surprised to find that only about 18% of those who survive are able to return to a full and active life.

Now there is no doubt that every physician and every cardiologist knows of patients who have survived 20 or more years following the onset of angina pectoris and who have worked and lived reasonably active lives, and there are many cases reported in the literature. Such cases, however, are the exception rather than the rule, as every general practitioner knows.

TABLE II.

LONGEVITY AFTER FIRST ATTACK OF CORONARY OCCLUSION

Author	*Number patients*	*Survived first attack*	*1st year*	*2nd year*	*5th year*	*10th year*
Conner & Holt, 1930[12]	287	117	75% well	56% well	21% well	
Levine & Rosenbaum, 1941[14]	372		75% alive	50% alive	25% alive	
Sigler, L. H. 1951[17]	1,208			81.5 (F.) alive	39.8 (F.) alive	10.4 (F.)
				83.1 (M.) alive	45.3 (M.) alive	10.7 (M.)

NOTE:—Average age onset for Sigler's group—55 years.

TABLE III.

PROGNOSIS WITH CORONARY ARTERY OCCLUSION WITH INFARCTION

Author	*No. patients with coronary thrombosis*		*Mortality*
Conner & Holt, 1930[12]	287		16.2% dead—first attack
Bedford, 1935[13]	31		6 months
Levine & Rosenbaum, 1941[14]	372	101 fatal cases	3.4 years
Master *et al.*, 1936[15]	243	8% dead up to time of discharge	
Katz *et al.*, 1949[16]	488	with infarction	25% dead—2 months 50% dead end of 1 year 75% dead end of 3 years
Sigler, L. H. 1949[17]	1,208	423 died after one attack or more	Avge. longevity 3.8 yrs. (M.) Avge. longevity 3.1 yrs. (F.)
		785 alive after one or more attack	Avge. longevity 4.9 yrs. (M.) Avge. longevity 4.5 yrs. (F.)
Bruck, W. J., Crumpacka, E. L.[11a]	1,302	cases—previous infarction	5 yr. survival 45.9% 10 yr. survival 26.0%
Dry, T. J. & Gage, R. P.	204	cases—subsequent infarction	5 yr. survival 41.2% 10 yr. survival 22.7%

It is thus clear that from the most optimistic figures, less than 50% of patients with one coronary artery occlusion will be alive at the end of 5 years, and less than one-third of those who survive the first attack are asymptomatic and are capable of gainful occupation. It would seem from the figures presented that the disease progresses after the first coronary occlusion. Certainly this appears to be true between the first and fifth years after the initial attack (see Table II). Natural forces in the form of collaterals take over after the first coronary occlusion and maintain the myocardial muscle fibres in reasonable condition. Unfortunately, the process of coronary artery sclerosis is progressive, so that

gradually more and more collaterals are shut off and more and more muscle becomes fibrotic. Thus, if a new source of blood can be brought to the myocardium before it is destroyed, there is every reason to believe that further myocardial destruction can be stopped.

It must be remembered that the functional unit of the heart is the myocardial fibre. Once this is destroyed it cannot be replaced. When a great number of these fibres are destroyed the reserve of the heart is greatly diminished and eventually a condition is reached where so many myocardial fibres have been destroyed and replaced by fibrous tissue that the most ideal method of revascularization can do nothing to help such a heart. Therefore, it is important to realize that the revascularization of the myocardium should be attempted as soon as possible to prevent progressive destruction and ultimate fatal loss of myocardial fibres. The onset of angina in severe form is, in our opinion, a definite indication for making an attempt at surgical revascularization of the myocardium. This will be discussed later under indications.

Experimental criteria.—It has often been said of experimentation that what is true of the animal does not necessarily apply to man and therefore that experimental evidence is of little value. This is partly true. However, what is much more likely to be true is that if a procedure does not work in the heart of a dog or a pig, it is not at all likely to be of value in the heart of a human being. Far too many new medical and surgical treatments have been tried out on human subjects without having been adequately tested in the laboratory.

Many new drugs have been used in the treatment of angina pectoris which were at first hailed with enthusiasm only to fall into the discard in the light of cold facts. Likewise, numerous surgical procedures have been devised, each to gain a measure of popularity, largely dependent upon the personality and energy of the surgeon who developed the procedure, and each, in turn, like other forms of treatment, to be later abandoned. Practically all of these many therapeutic measures were founded on clinical and not upon laboratory data.

In the development of methods for revascularizing the myocardium, there are certain experimental facts which must be demonstrated before the method is applied to human coronary insufficiency. Three different types of surgical procedure are now used in the treatment of human angina pectoris, namely (1) the procedure of pericardial cardiopexy, (2) arterialization of the coronary sinus, and (3) internal mammary artery implant. In this article I wish to present the method of revascularization of the ventricular myocardium which has been developed and tested in the experimental laboratories of McGill University in the past 8 years, namely that of internal mammary artery implant.

ARTERIALIZATION OF THE INTRAMURAL VESSELS OF THE LEFT VENTRICULAR MUSCLE BY MEANS OF INTERNAL MAMMARY ARTERY IMPLANTATION

Before proceeding to the details of this method for the revascularization of the ventricular muscle, a short review of the histological, anatomical and pathological structure of the myocardium must be given. There are two factors now generally accepted upon which the procedure of internal mammary artery implantation is based: one is the anatomical pattern of the myocardial circulation, the other is the modern concept of the pathology of coronary artery sclerosis.

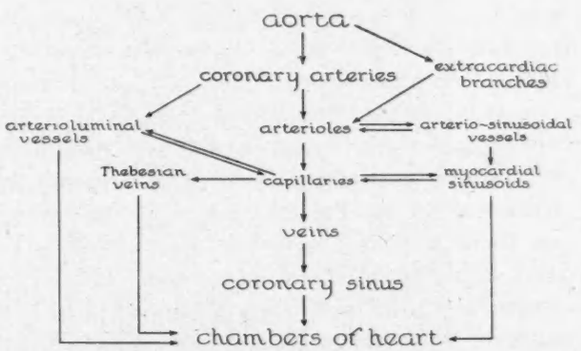


Fig. 1.—Relationship between the various components of the coronary circulation.

1. *Anatomical structure of the ventricular myocardium.*—It is well known that there are many differences between cardiac and skeletal muscles. The differences in which we are most interested concern the peculiarly rich network of blood vessels which supply the myocardial muscle fibres. Actually, there exists within the myocardium a veritable sponge-work of vessels. Their arrangement is graphically shown in Fig. 1.[19] As the smaller branches of the coronary arteries subdivide, they leave the surface of the heart and penetrate the myocardium at right angles. As they approach the endocardial surface they resume their horizontal direction and arborize

Canad. M. A. J.
April 1954, vol. 70

into a rich arteriolar bed from which the capillaries arise. The arterioles also communicate directly with sinusoid arterial spaces which connect with the myocardial sinusoids. These latter vessels, with a lumen of from 50 to 250 μ in diameter, run a wandering course about the muscle fibres and anastomose with each other and the capillaries. Because of the structure of the myocardium, an implanted internal mammary artery with an open attached intercostal vessel fails to form a surrounding hæmatoma and remains patent for an indefinite period of time.

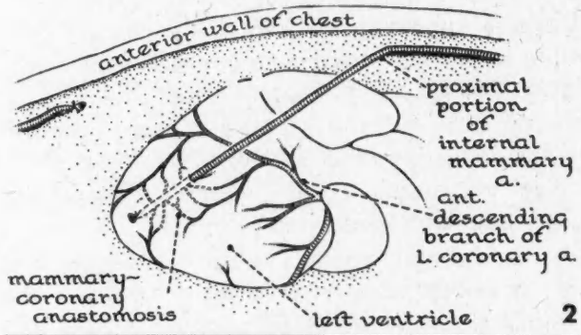
The second factor which indicates that internal mammary artery implant will be a successful method of treating coronary artery insufficiency is based on the pathological character and distribution of coronary artery disease.

2. *Pathology of coronary artery disease.*—The generally accepted idea that coronary artery disease is widely spread throughout the coronary tree has not been borne out by pathological study. Arteriosclerosis of the coronary arteries is usually, if not always, confined to the epicardial part of their courses and never involves the penetrating myocardial branches to any significant degree. Thus, in coronary artery sclerosis there is a vast network of arterioles, etc., deep within the myocardium which are free of disease.[20, 21] If arterial blood is delivered to this network, then it can reach all parts of the ventricular myocardium. An implanted internal mammary artery thus can bridge over the blocked superficial coronary vessels so that arterial blood can reach the intact deep arteriolar system of vessels which are still open and free of disease.

In the evolution of human coronary artery sclerosis a similar process occurs. It has been shown by Zoll[22] that in the normal human heart intercoronary anastomoses are rare. However, in the presence of arterial occlusion, intercoronary anastomoses develop distal to the point or points of occlusion. The development of such intercoronary anastomoses occurs frequently and probably prevents myocardial infarction when the occlusion develops slowly. Zoll reports a study on a human heart with occlusion of the left anterior descending, left circumflex, and right coronary vessels, of such extent that the major portion of blood supplied to the heart came from a large separate conus artery which was connected with small branches below the points of occlusion in the descending coronary artery. It is thus not surprising to find that an implanted internal mammary artery placed beyond the point of coronary artery occlusion and among the deep myocardial vessels is capable of vascularizing the left ventricular muscle.

PROCEDURE

The left internal mammary artery is freed from the chest wall from the 4th to the 6th intercostal space. The distal end is doubly ligated and transected between the ligatures. A tunnel is made in the anterior wall of the left ventricle and the freed portion of the artery is pulled into the tunnel and there fixed. The intercostal vessels which arise from the freed portion of the internal mammary artery are ligated, except for the 6th, which is transected just before the implant is pulled into the myocardial tunnel. The internal mammary artery is thus placed in a tunnel within the ventricular myocardium, with an open, freely bleeding intercostal branch (Fig. 2).



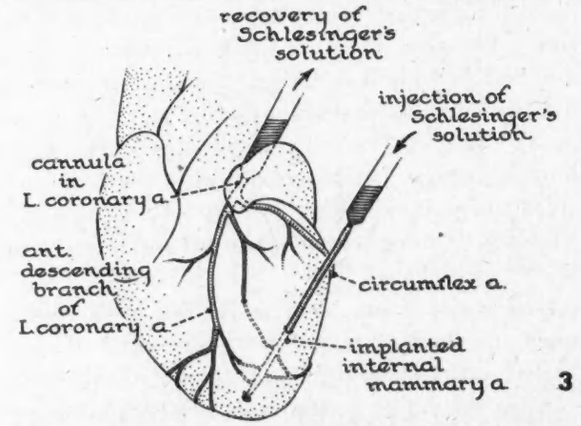


Fig. 2.—Internal mammary artery detached from its chest wall attachment and buried in a tunnel in the left ventricular myocardium. Open stumps of intercostal not shown. **Fig. 3.**—How Schlesinger's injection mass is introduced through a cannula placed in the internal mammary artery weeks to months after implantation. In the presence of mammary-coronary anastomosis, the injection mass spreads throughout the left coronary arterial network and emerges from a second cannula placed in the mouth of the left coronary artery.

In another technique the artery is buried with its end open (Figs. 6 and 7).

In previous publications[23, 24, 25] it was shown that an anastomosis developed between the implanted internal mammary artery and the left coronary circulation. The presence of such mammary-coronary anastomosis in dogs was proven in the following manner.

Weeks or months after implantation the animals were sacrificed. Two separate cannulas were used: one was inserted into the internal mammary artery facing towards

the heart, the other was tied in the mouth of the left coronary artery. The heart and attached internal mammary artery were removed from the thoracic cavity, and Schlesinger's injection mass was introduced through the internal mammary artery. This injection mass is known to pass freely through no vessel smaller than an arteriole 40 microns in diameter. Where there was a large anastomosis the injection mass was seen to enter the internal mammary artery, spread throughout the coronary arteries of the left ventricle, and fill the cannula placed in the mouth of the left coronary artery (Fig. 3). This would indicate that the anastomosis is with the arterial rather than the venous side of the coronary circulation. After injection x-rays were taken to show the distribution of the injection mass throughout the coronary circulation.

Following x-ray studies, sections were taken through the area of implantation and serial section studies were made. These serial sections showed branches leaving the implanted internal mammary artery, and these branches could be followed out into the myocardium. In Fig. 4, serial sections are shown which have been taken through the site of internal mammary artery implantation 48 days after implant. Note how the injection mass in the lumen of the implanted internal mammary artery can be followed out through a new branch into the myocardium.

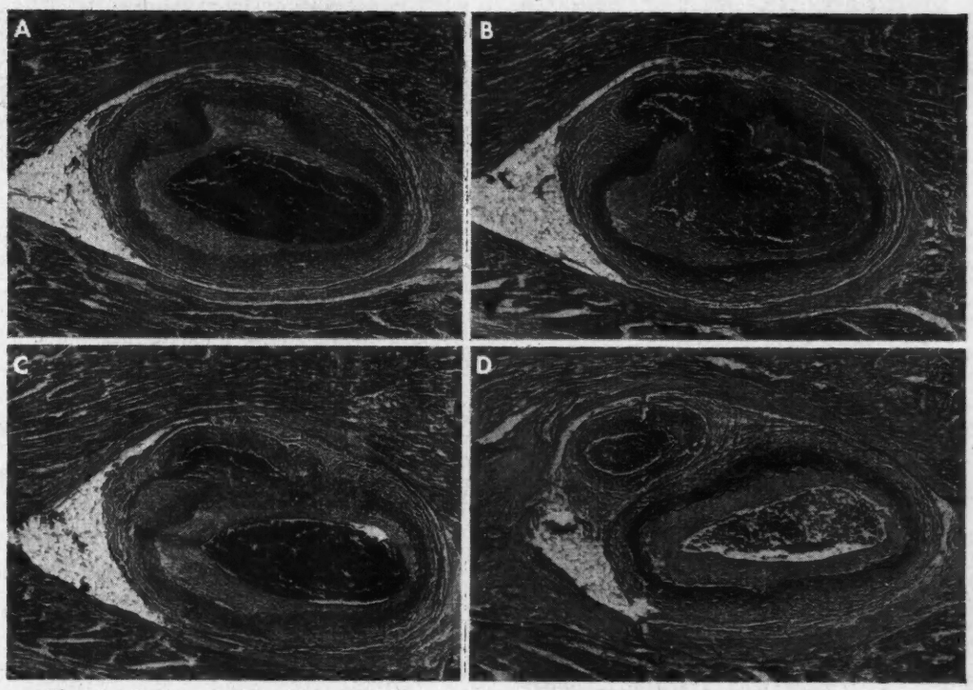


Fig. 4.—Serial sections through site of internal mammary artery implant 48 days after implantation showing branching of transplant, with injection in lumen.

Having proven the presence of mammary-coronary anastomosis by injection, by radiographic studies, and by serial section, it was then decided to attempt visualization of the anastomosis by plastic casts.

From a few days to many months after implantation, a plastic solution was injected into the proximal end of the internal mammary artery. At the same time, similar plastic solutions of different colours were introduced into the left coronary artery and the coronary veins. The injection mass did not enter the capillary vessels. Acid and alkaline solutions were used for digestion and the resulting casts were studied under the dissecting microscope.

Two types of implants were studied: one in which the internal mammary artery was buried within the myocardium with its end open, and the other with it closed but with an attached open bleeding intercostal branch. When the internal mammary artery is buried with its end open and bleeding into a myocardial tunnel, an anastomosis occurs between it and the left coronary arterioles within 5 days. The entire left coronary arteriolar system can be filled with plastic substance through this implanted artery (Figs. 5 and 6). Such anastomoses have been found to be present at least 2½ months after implantation (Fig. 7).

When the internal mammary artery is buried with its end closed, but with an open 6th intercostal artery, *i.e.*, the standard implant described frequently during the past 8 years, then the artery can be seen to branch at the end of 12 days (Fig. 8).

These branches grow and at the end of 3 to 4 weeks are well formed arterioles which join up

Canad. M. A. J.
April 1954, vol. 70

with arterioles lying in the left ventricular myocardium (Fig. 9). The anastomoses between the new branches from the internal mammary artery and the arterioles of the left coronary artery are, however, not usually fully developed under 6 weeks to 2 months.

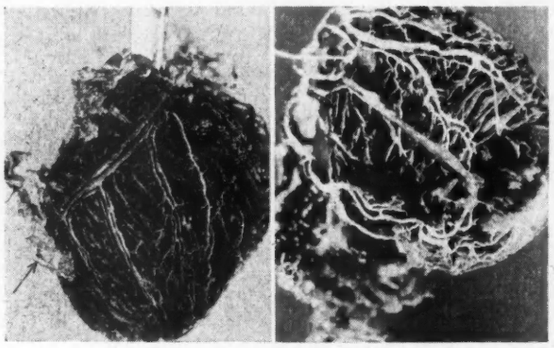


Fig. 5 Fig. 6

Fig. 5.—Internal mammary artery (arrow) freed from subclavian to 6th intercostal artery and open end implanted in 2″ tunnel in left ventricular myocardium. Dog killed 5 days later in fight. Vinylite plastic injected through the internal mammary artery is seen to fill arterial vessels of left ventricle. **Fig. 6.**—Same cast as Fig. 5, except that the coronary vessels superficial to the implanted internal mammary artery were removed to show underlying internal mammary artery. **Note** how in 5 days vessels leave the implanted internal mammary artery to join the left coronary arteries.

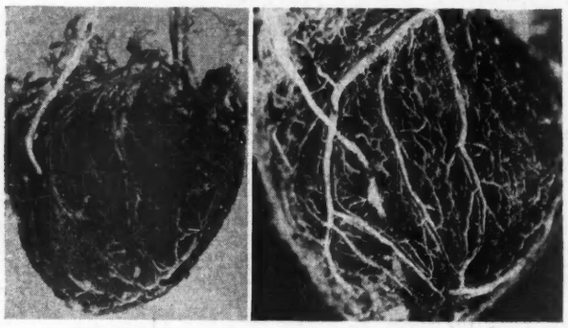


Fig. 7 Fig. 8

Fig. 7.—Internal mammary artery freed from chest wall from 6th intercostal artery to subclavian and open distal end buried in 2″ tunnel in myocardium of left ventricle: partial ligation of origin anterior descending done simultaneously. Chest opened 77 days after operation and subclavian artery isolated and injected with india ink. The ink was seen to flow down the internal mammary artery into the heart, where it was seen in the coronary vessels. Note vast mammary-coronary artery anastomosis, also mammary-venous anastomosis. **Fig. 8.**—Internal mammary artery freed from chest wall between 4th and 6th intercostals and placed in 1″ long tunnel in the ventricular myocardium with open stump of 6th intercostal. This animal died of pneumonia 12 days later. Cast made by injecting internal mammary artery with vinylite plastic, and cut away to show buried internal mammary artery with stump of 6th intercostal (arrow). **Note** tufting and branching from open stump of 6th intercostal attached to internal mammary artery.

In some of our injected specimens the casts show that the new branches join, not only with the coronary arterioles, but occasionally with the coronary veins (Fig. 7).

DURATION AND CHARACTER OF CORONARY-MAMMARY ANASTOMOSIS

Glenn[26] and associates have confirmed the development of an anastomosis between an implanted internal mammary artery and the coronary vessels. However, they stated that the new

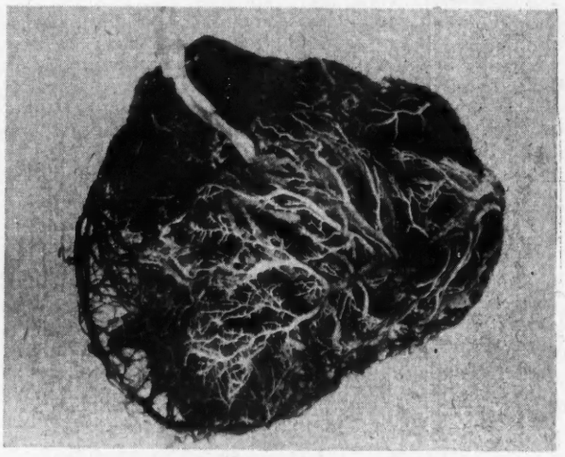


Fig. 9.—Internal mammary artery freed from 4th to 6th intercostal and implanted in 1″ tunnel in left ventricular wall with attached open 6th intercostal. Piece of sclerosing cellophane simultaneously wrapped around origin of anterior descending branch. Animal sacrificed 23 days later because of distemper. Mammary-coronary anastomoses well shown.

vessels tend to disappear at the end of 8 weeks. They further suggested that the new vessels were small and resembled granulation tissue. In our series, the average interval from implant to sacrifice was 11 weeks (Table IV). One animal was kept for 58 weeks after implantation. The anastomoses at the end of that time not only persisted, but were large enough to protect against death and infarction following ligation of the anterior descending branch.

Not only has it been suggested that a coronary-mammary anastomosis tends to disappear at the end of 8 weeks, but it has also been suggested that the anastomosis is capillary in nature. Serial sections of 7 implants have been examined. Special preparations of these serial sections have been made to show elastic and muscle tissue. The character of the new branches formed by the internal mammary artery implant has thus been studied. They have been found to be arterial in nature, containing both muscle and elastic tissue in their walls. These new arterial branches have been followed by serial section far out into the myocardium until they disappear.[27]

VALUE OF CORONARY-MAMMARY ANASTOMOSIS

Histo-anatomical proof of anastomotic channels between extra-cardiac arterial sources and the coronary circulation gives no indication of its functional value. This is true not only of coronary-mammary anastomosis but of all other procedures used for augmenting myocardial circulation. Functional tests give the best indication of the value of the new arterial blood supply. These may be divided into three groups:

I. Survival experiments following ligation of the anterior descending branch of the left coronary artery.
II. Determination of the direction of blood flow in the internal mammary artery.
III. Experimental production of myocardial ischæmia and its treatment by internal mammary implantation.

I. *Survival experiments following ligation of the anterior descending branch of the left coronary artery.*—There is some divergence of opinion in the literature as to the effects of ligation of the anterior descending branch of the left coronary artery. Some claim a low mortality for this procedure, and others claim a high mortality. The majority of investigators have found the mortality in dogs to range from 70 to 80%. In our series of 10 control dogs, the average mortality rate from anterior descending branch ligation was 80%. It is our belief that the great variation in mortality reported in the literature following anterior descending branch ligation is dependent upon the site of ligation.

Method of ligation.—The anterior descending branch of the left coronary artery should be ligated at its origin. The position of the ligature must be carefully checked by examining the left coronary artery to make certain that the ligature has included all branches, other than the circumflex. Frequently, one or two septal branches are missed, and occasionally branches arise from the main trunk of the left coronary artery.

An analysis of the results of anterior descending branch ligation is shown in Table V. A total of 78 dogs had anterior descending branch ligation. There were 10 control animals, and 39 other animals in which the coronary circulation was not augmented. In this group of animals there was an overall 80% mortality, with a 20% survival with infarction. In 29 animals in which a large mammary-coronary anastomosis had developed, there were no deaths and no infarctions following anterior descending branch ligation. Thus it would seem that coronary-mammary anastomosis not only increases coronary circulation, but gives protection against death and infarction.

TABLE IV.

DURATION OF ANASTOMOSIS

Type of anastomosis	*No. of animals*	*Presence of anastomosis after implant (weeks)*	*Value of anastomosis after ligation of anterior descending branch of the left coronary artery*
Microscopic anastomosis	1	5	
	1	6	
	1	7	
Anastomosis small due to thickened or partially thrombosed internal mammary artery	2	8	Protection against death or infarction afforded in three animals only
	2	11	
	2	12	
	2	13	
	1	14	
	12		
Macroscopic anastomosis	1	6	
	2	7	
	5	9	No deaths or infarction occurred.
Anastomosis large	5	11	
	4	12	
	2	14	
	1	17	
Internal mammary artery patent	1	18	In coronary artery sclerosis, caused by cellophane irritation, marked improvement in exercise tolerance occurred.
	3	19	
	1	21	
	1	31	
	1	41	
	1	46	
	1	58	
	29		

TABLE V.

EXPERIMENTAL DATA (VINEBERG ET AL.)

	Ligation anterior descending branch of the left coronary artery			
	No. of dogs	*Death*	*Survival with infarction*	*Survival without infarction*
Control	10	80%	20%	0
Internal mammary artery implant and/or other experiments but without augmentation of the coronary circulation	39	80%	3%	17%
Internal mammary artery implant with coronary anastomosis	29	——	——	100%

NOTE:—Internal mammary artery after implantation forms anastomoses with coronary circulation in from 50% to 75% of animals operated upon.

The experimental data shown in Table V indicates that coronary-mammary anastomosis when it occurs is of value in protecting against death or infarction. However, because of the differences of opinion concerning the value of survival after descending branch ligation, a second group of functional experiments were performed.

II. *Direction of blood flow in implanted internal mammary artery.*—The direction of blood flow through the implanted internal mammary artery was studied in order to determine whether

Canad. M. A. J.
April 1954, vol. 70

it was bringing blood to the ventricular myocardium. Direct determination of the direction of blood flow in the internal mammary artery was difficult, so the indirect method was used. Animals which survived anterior descending branch ligation of the left coronary artery were subjected, 4 to 5 weeks later, to complete and sudden occlusion of the implanted internal mammary artery. If the internal mammary artery was maintaining the circulation of the left ventricle, then following the ligation, either death or infarction should result. This is exactly what happened. In 3 animals with an internal mammary implant which had survived anterior descending branch ligation, the internal mammary

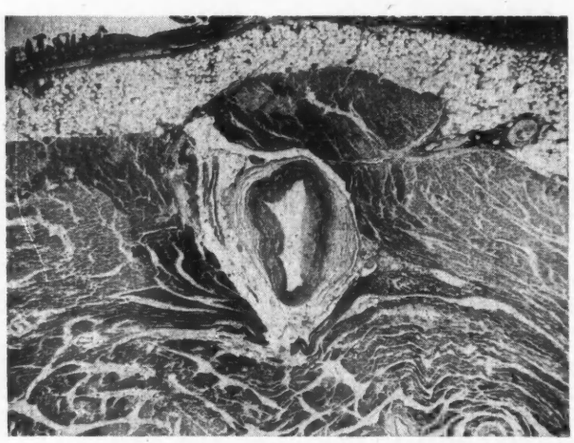


Fig. 10.—Section through human heart at site of internal mammary artery implant 62 hours later. **Note** how the vessel lies open, between the myocardial fibres, and the absence of surrounding hæmatoma. This is remarkable because the artery was pulled into position with an attached open bleeding intercostal vessel. The absence of clot in the lumen of the vessel is likewise to be noted.

artery was ligated. One animal died within 24 hours and displayed an œdematous, cyanotic area of the anterior wall from a large infarct in the same location. Another animal survived, but examination of the sacrificed specimens revealed that multiple inter-coronary anastomoses were present.

In all these animals there was a demonstrable mammary-coronary anastomosis. There can be little doubt that in those animals which died following internal mammary artery ligation, the circulation of the anterior portion of the left ventricle was being maintained by the internal mammary artery implant.

The evidence just presented suggested that the internal mammary artery after implantation into the left ventricular wall is capable of maintaining the left ventricular circulation. These experiments, however, were carried out on the hearts of normal animals. It was therefore necessary to attempt to artificially produce coronary artery insufficiency, and to treat it by internal mammary artery implantation.

Thus, we set out to experimentally produce and treat coronary artery insufficiency, and so establish a third functional test of the value of an internal mammary-coronary anastomosis.

III. *Experimental production and treatment of coronary artery insufficiency.*—In this series of experiments, coronary artery insufficiency was produced in dogs and treated by internal mammary artery implant. The first problem was to find a method of producing coronary artery occlusion which would simulate that which occurs in human coronary sclerosis. The second problem concerned the evaluation of coronary insufficiency when it was produced, and its response to treatment.

Method of producing coronary artery insufficiency.—The anterior descending branch of the left coronary artery was exposed at its origin. Beneath the left auriculoventricular sulcus to the left of the pulmonary trunk, the epicardium overlying the vessel was incised and the bifurcation of the main coronary artery exposed. A doubly folded strip of cellophane (Dupont-P.T.300), sterilized for 24 hours in a saturated solution of mercury oxycyanide, was twice wrapped completely, but loosely, around the origin of the anterior descending branch of the left coronary artery and fixed in position. Thus a segment of artery from 4 to 8 mm. long was completely surrounded with cellophane.

The cellophane initiated a fibroplastic reaction, with collagen deposition about the artery. As subsequent contracture of the new fibrous tissue occurred, the lumen of the anterior descending branch of the left coronary artery was slowly narrowed. Gradually that portion of the myocardium nourished by this vessel became ischæmic.

At the end of the experiment when the animals were sacrificed, the anterior descending branch of the left coronary artery was probed to determine the extent of the narrowing. Sections were made through the artery at the site of the cellophane wrap, and careful histological studies made of the degree of coronary occlusion.

Method of evaluation of experimentally produced coronary insufficiency and its treatment:

Exercise tolerance test.—In human coronary artery insufficiency there are two outstanding symptoms, namely, substernal pain, and intolerance to exercise. In the dog, it is most difficult to detect the presence of pain. It is, however, not difficult to determine accurately the animal's tolerance or intolerance to exercise.

Clinical and pathological experience have associated progressive exercise intolerance with progressive myocardial ischæmia. Thus, in the experimental animal, progressive diminution of exercise tolerance has been accepted as evidence of myocardial ischæmia. In this series of experiments, myocardial ischæmia was produced by a cellophane wrap placed around the origin of the anterior descending branch of the left coronary artery. Exercise tolerance studies were carried out before and after cellophane wrap. Later, after internal mammary artery implant, they were repeated in order to establish whether improvement had occurred.

A treadmill was used to exercise the animals. This was made originally for man and was thus very satisfactory for exercising large animals. The exercise tolerance of each animal was established prior to

wrapping the anterior descending branch with sclerosing type cellophane. Two groups of animals were studied. The first group was composed of those animals in which coronary artery insufficiency was produced by cellophane occlusion of the anterior descending branch, and treated by internal mammary artery implant. In this series the average running time was reduced from 9 to 12 minutes to 2.5 to 4 minutes, at 8½ miles per hour, 3 months after cellophane wrap. These animals were given an internal mammary artery implant and, 3 to 5 months later, the running time had returned to 6 to 8 minutes respectively, whereas the control animals had an average running time of 1.6 minutes at 8½ miles per hour. In those animals with an implant in which the running time had returned, there was a wide open coronary-mammary anastomosis.

In the second group of animals, an internal mammary artery implant was performed at the same time as the cellophane wrap around the anterior descending branch. Where there was a widely patent mammary-coronary anastomosis there was no appreciable reduction in exercise tolerance.

TREATMENT OF HUMAN CORONARY ARTERY INSUFFICIENCY BY INTERNAL MAMMARY ARTERY IMPLANTATION

On the basis of the foregoing anatomical, functional and pathological facts, the internal mammary artery implant procedure has been used in the treatment of human cases of coronary artery insufficiency.

Selection of patients.—The selection of patients for a new procedure is always difficult. We dislike classifications, but, in a general way, we have found it convenient to divide our cases of coronary artery insufficiency into four groups:

Group 1.—Mild or intermittent angina. In this group are those patients who experience an occasional attack of anginal pain on exercise, or during an emotional disturbance. They are able to work, and are capable of living reasonably normal lives. For this type of patient operation is not advisable: it is better to stop playing golf!

Group 2.—Progressive coronary artery insufficiency without disability. Evidence of progressive coronary artery insufficiency is an important indication for surgery. Patients in this group may still be working, but there is evidence of progression of their disease. This may be shown in the electrocardiogram, or by an increase in the frequency of anginal attacks and, perhaps, progressive dyspnœa.

Group 3.—Partially or totally disabled, but without angina at rest. In this group are hundreds of thousands of people, men and women, who are unable to walk more than 50 to 100 feet, or to do 22 steps on the Master two-step test, without anginal pain. Many suffer pain at rest, but in association with emotion, straining at stool, or a heavy meal. Some have night pain, which awakens them. However, when sitting quietly in a chair, without stimuli, they are free from pain. Such cases have been accepted for surgery, in fact surgery should be encouraged, as it has been shown that less than 50% of such patients are alive at the end of 5 years. Another coronary artery occlusion may so lower their myocardial reserve as to place them in the hopeless, inoperable group of patients with status anginosus.

Group 4.—Status anginosus.—In this group are patients who experience angina at rest. These patients chew nitroglycerine tablets day and night. One of our patients in this group consumed 180 nitroglycerine tablets in 2 weeks. This type of patient should not be submitted to cardiac surgery. There is insufficient cardiac muscle left to revascularize. Generally, these patients are living on a pin-point opening in the one artery which is still open. Such a small opening usually cannot supply sufficient blood to the myocardium to keep the patient alive during and after a major thoracic procedure. In addition, such patients generally have very little myocardial muscle left to revascularize.

Preoperative investigation.—With each patient we have attempted to exclude all other possible causes for his symptoms. This has been done in spite of a well established diagnosis of coronary artery insufficiency. Thus a search is made for intervertebral disc, infradiaphragmatic and supradiaphragmatic lesions, and in all cases, a psychiatric screening is done. A careful examination of serial electrocardiograms must be made for evidence of recent activity, as well as repeated sedimentation rates. In a few cases we have postponed operation for from 4 to 6 months on evidence of activity.

Contraindications.—(1) Evidence of left ventricular failure. The history of left ventricular failure during an attack of myocardial infarction, with recovery, is *not* a contraindication. However, the presence of left ventricular failure is most definitely a contraindication. (2) Enlargement of the left ventricle, unless it is due to hypertrophy associated with moderate hypertension. (3) Advanced cases of essential hypertension. (4) Evidence of recent myocardial infarction or of active disease. (5) Status angina.

This report deals with our experience with 12* cases of coronary artery insufficiency which have undergone internal mammary artery implantation

*Total number cases operated upon now 28.

in the past 3 years. Some of the facts concerning each patient are shown in Table VI. The cases have been divided into two groups—those without angina at rest, and those with status angina. All of these patients were male. Their ages varied from 36 to 57 years—the majority were over 52 years. All were unable to work at the time of operation. Their periods of disability varied from 7 to 36 months.

Of these 12 patients, 10 had had one or more proven myocardial infarctions. Anginal pain was not the only symptom. In 7 of these cases, dyspnœa on effort, and in 6 cases fatigue, were prominent symptoms. Exercise tolerance varied from 50 feet to 200 feet on the level, and was markedly lowered in the two-step test. Their occupations varied from that of physician to that of machinist-welder. It should be noted that practically all of these patients were desperate. They had reached a stage where life was no longer livable. The majority of them fully expected to die from the operation—and did not care. Even after the mortality rate and the chances of failure were explained to them, they elected to undergo surgery. Two of the surviving 12 patients had had anterior and posterior ventricular infarctions. This is interesting in view of Bailey's statement that multiple infarction is a contraindication to surgery. It must be stated, however, that all three of the patients who died had had two or more infarcts. These patients, however, had pain at rest: their exercise tolerance was zero.

In the selection of coronary insufficiency patients for surgery, the condition of the ventricular myocardium to be revascularized is the crux of the situation. It is futile to attempt to revascularize scar tissue. Clinical estimation of the amount of myocardial muscle remaining to revascularize is most important. We believe that exercise tolerance studies, combined with fluoroscopy and electrocardiography, help to estimate the myocardial reserve.

TABLE VI.

					No Angina at Rest, Anginal Pain						
Name	*Sex*	*Age*	*Occupation*	*Time disabled (months)*	*At rest*	*Amount exercise*	*Eating*	*Night*	*Dyspnœa*	*Fatigue*	*Previous infarction*
D.M.	M.	54	Oil field worker	7	No	150 ft.	Yes	No	Yes	Yes	None
E.S.	M.	49	Executive	24	No	100 ft.	Yes	No	Yes	No	Anterior posterior
C.A.	M.	55	Machinist welder	24	No	150 ft.	Yes	No	No	No	Large anterior
A.M.	M.	55	Grocer	10	No	50 ft.	Yes	No	Yes	Yes	None
S.E.	M.	57	Electrician	10	No	50 ft.	No	No	No	No	Large anterior
G.A.	M.	52	Farmer	28	No	200 ft.	No	No	Yes	Marked	Posterior
L.G.M.	M.	39	Physician	24	No	50 ft.	Yes	Yes	Yes	Marked	Anterior posterior
M.B.	M.	36	Railroad switchman	18	No	75 ft.	Yes	Yes	Yes	Yes	Anterior septal
C.H.	M.	48	Engineer	17	No	50 ft.	Yes	Yes	Yes	Yes	Posterior
					Status Angina						
J.P.	M.	53	Tailor	36	Yes	zero	Yes	Yes	No	No	Anterior posterior
F.C.	M.	57	Civil servant	36	Yes	100 ft.	Yes	Yes	Yes	No	Anterior posterior
A.C.	M.	46	Stevedore	12	Yes	150 ft.	Yes	Yes	Yes	No	Anterior posterior

Results

The results of operation are shown in Table VII. Twelve patients have had the operation of internal mammary artery implant completed. Of these 12, nine have lived. There have been no deaths among the patients who had no angina at rest. Even though two of these patients had had both anterior and posterior infarctions, there was still some myocardial muscle left to revascularize. Both of these patients have done

well. In the group of 9 patients, all had been incapacitated before surgery; none were working. Now 7 of them are working. Three have slight pain on severe exertion, and one has severe pain. Five are completely free of pain. It should be noted that in the case of our first surviving patient, it is now 3 years since operation, and from a condition of complete disability he can now walk 10 miles through the bush.

There has been one failure in the group: he still suffers pain as severe as before the operation. Examination of his heart under the fluoroscope reveals that the apex is tilted upward and laterally, and this is accentuated during deep respiration. It would seem that the internal mammary artery was placed in the heart without sufficient slack to allow for the movement of respiration. This artery is most likely firmly thrombosed.

Perhaps the most interesting case is that of "S.E." a 57 year old electrician, with a large anterior wall infarct, who was totally incapacitated. He was operated upon in March, 1952, and returned to his work in September, 1952, feeling extremely well. In May, 1953, he developed severe sub-sternal pain and was hospitalized for what appeared to be an attack of myocardial infarction, but which turned out to be coronary artery occlusion without infarction. This man returned to work in July, 1953, and is still working. His electrocardiogram reveals no change since operation. It would seem that he underwent coronary artery occlusion without infarction. In a heart such as his, but without internal mammary artery implant, if death had not occurred at least infarction should have occurred following a third coronary artery occlusion.

Of the 3 patients with status angina, two died 60 and 62 hours after operation, and one died of cardiac arrest on the operating table. In these patients, the two major arteries were found to be blocked at autopsy, and they were living on a pin-point opening in a remaining vessel. In each instance there was very little muscle left to revascularize and this was extremely thin. Fig. 10 shows a section through the site of internal mammary artery implant in our first fatal case. Note that the artery at the end of 62 hours after implantation is widely open and that there is no surrounding hæmatoma.

TABLE VII.

RESULTS

Name	*Time since operation (months)*	*Occupation*	*Anginal pain*	*Exercise tolerance*		*Ability to work hours per day*	
				Before	*After*	*Before*	*After*
D.M.	34	Oil field worker	None	150 ft.	Up to 10 miles	No	8 hrs.
E.S.	34	Executive	*Yes*	100 ft.	Dances, etc.	No	No
C.A.	33	Machinist	Following severe exercise only	150 ft.	½ mile	No	16 hrs.
A.M.	27	Grocer	Slight, on severe exertion only	50 ft.	¼ to ½ mile	No	Part time
S.E.*	18	Electrician	Occasional	50 ft.	½ mile	No	8 hrs.
G.A.	9	Farmer	None	200 ft.	Not known	No	Working
L.G.M.	7	Physician	None	50 ft.	1 mile	No	Postgraduate course
M.B.	2	Railroad switchman	None	75 ft.	Not tested: improved	No	Convalescing
C.H.	3	Engineer	None	50 ft.	1 mile	No	Working

Status angina—3 cases—all died within 62 hours of surgery

*S.E.—Internal mammary artery implant, March 1952. Returned to work September 1952. May 1953, had severe substernal pain: considered to be thrombosis without infarction. July 1953, returned to work. Has slight pain, on exertion only. No change in electrocardiogram following recent thrombosis.

CONCLUSION

It has been shown experimentally:

1. That the internal mammary artery, after implantation into the left ventricular myocardium, forms an anastomosis with the left coronary circulation.

2. That the implant is capable of sustaining life and preventing infarction when a major coronary vessel, the anterior descending branch, is occluded.

3. That the implant is capable of revascularizing the myocardium in a high percentage of experimental cases.

Twelve human subjects have been operated upon, with 3 deaths, and 8 good results.

One patient has had coronary occlusion since operation, without infarction. This patient has returned to work and it would appear that his mammary artery implant protected most probably against death, and most definitely against infarction.

REFERENCES

1. VINEBERG, A. M.: *Canad. M. A. J.* **55**: 117, 1946.
2. VINEBERG, A. M. AND JEWETT, B. L.: *Canad. M. A. J.*, **56**: 609, 1947.
3. VINEBERG, A. M. AND MILLER, G.: *Canad. M. A. J.*, **64**: 204, 1951.
4. HERRICK, J. B. AND NUZUN, F. R.: *J. A. M. A.*, **70**: 67, 1918.
5. MACKENZIE, J.: New York, Oxford Press, 1932.
6. WHITE, P. D.: *J. A. M. A.*, **87**: 1525, 1926.
7. WHITE, P. D. AND BLAND, E. F.: *Am. Heart J.*, **7**: 1, 1931.
8. WHITE, P. D., BLAND, E. F. AND MISKALL, E. W.: *J. A. M. A.*, **123**: 801, 1943.
9. EPPINGER, E. C. AND LEVINE, S. A.: *Arch. Int. Med.*, **53**: 120, 1934.
10. WEDD, A. M. AND SMITH, R. E.: *Am. J. M. Sc.*, **189**: 690, 1935.
11. PARKER, R. L., DRY, T. J., WILLIUS, F. A., AND GAGE, R. P.: *J. A. M. A.*, **131**: 95, 1946.

11a. BRUCK, W. J., CRUMPACKA, E. L., DRY, T. J. AND GAGE, R. P.: *J. A. M. A.*, **150**: 259, 1952.

12. CONNER, L. A. AND HOLT, E.: *Am. Heart J.*, **5**: 705, 1930.
13. BEDFORD, D. E.: *Lancet*, **1**: 223, 1935.
14. LEVINE, S. A. AND ROSENBAUM, F. E.: *Arch. Int. Med.*, **68**: 1215, 1941.
15. MASTER, A. M., JAFFE, H. L. AND DACK, S.: *Am. Heart J.*, **12**: 549, 1936.
16. KATZ, L. N., MILLS, G. Y. AND CISNEROS, F.: *Arch. Int. Med.*, **84**: 305, 1949.
17. SIGLER, L. H.: *J. A. M. A.*, **146**: No. 11, 1951.
18. FRIEDBERG, C. K.: Diseases of the Heart, W. B. Saunders, Philadelphia and London, p. 478, 1950.
19. WEARN, J. T., METTIER, S. R., KLUMPP, T. G. AND ZACHIESCHE, L.: *Am. Heart J.*, **9**: 143, 1933.
20. SCHLESINGER, M. J.: *Am. Heart J.*, **15**: 528, 1938.
21. *Idem*: *Arch. Path.*, **30**: 403, 1940.
22. ZOLL, P. M.: *Tr. Am. Coll. Cardiology*, **1**: 29, 1951.
23. VINEBERG, A. M.: *Canad. M. A. J.*, **55**: 117, 1946.
24. VINEBERG, A. M. AND JEWETT, B. L.: *Canad. M. A. J.*, **56**: 609, 1947.
25. VINEBERG, A. M. AND NILOFF, P. H.: *Gynec. & Obst.*, **91**: 551, 1950.
26. GLENN, F., HULSWADE, G. AND GORE, A. L.: Surgical Forum, Clinical Congress of the American College of Surgeons, p. 289, 1950.
27. BENCOSME, S. A. AND VINEBERG, A.: *Am. Heart J.*, **45**: 571, 1953.

RÉSUMÉ

Cet article relate l'expérience acquise pendant les dernières 3½ années avec l'implantation de l'artère mammaire interne dans douze cas d'insuffisance coronarienne. Les statistiques indiquent une moyenne de vie de cinq ans dans les cas d'angine de poitrine. Seulement 18% des survivants sont en état de reprendre une vie normalement active. La sclérose des coronaires est une lésion progressive. Une plus forte proportion du myocarde se fibrose à mesure que les collatérales sont envahies. L'apparition de la déchéance myocardique peut être retardée ou même évitée si le muscle est doté d'un nouvel apport sanguin. C'est pourquoi la revascularisation du myocarde doit être considérée le plus tôt possible afin d'en prévenir la destruction progressive.

L'implantation de l'artère mammaire interne est basée sur la distribution anatomique des vaisseaux irriguant le myocarde et sur les concepts modernes de la sclérose des artères coronaires. A cause de la structure même du muscle cardiaque, l'artère mammaire interne accompagnée d'une de ses intercostales, et implantée dans le myocarde, ne cause pas d'hématome et reste béante indéfiniment. L'athérome n'atteint habituellement que le réseau épicardial des coronaires, laissant plus ou moins intactes les branches profondes pénétrant le myocarde.

La technique opératoire consiste à introduire l'artère mammaire dans un tunnel creusé à même le myocarde du ventricule gauche. Le greffon artériel comprend un tronçon ouvert de la 6ième intercostale. L'étendue de l'anastomose a été vérifiée sur des spécimens anatomopathologiques par l'injection de la préparation de Schlesinger, par des études radiologiques basées sur l'injection de substances opaques, et, histologiquement, par des coupes en séries. Quand la mammaire interne est enfouie dans le myocarde avec son tronçon ouvert et saignant, l'anastomose se produit avec les artérioles de la coronaire gauche en 5 jours. Si le tronçon est ligaturé mais que la branche de la 6ième intercostale reste ouverte, l'anastomose se produit après 12 jours. Trois ou quatre semaines plus tard, ces jeunes vaisseaux sont devenus de véritables artérioles bien formées. Il arrive que l'anastomose se fasse aussi avec les veines. Les épreuves fonctionnelles auxquelles sont soumis ces nouveaux vaisseaux comprennent: 1—les expériences de survie après ligature de la branche descendante antérieure de la coronaire gauche; 2—la détermination de la direction de la circulation dans la mammaire interne; 3—la production expérimentalement d'ischémie du myocarde et son traitement au moyen de l'implantation de la mammaire interne.

Le choix des candidats pour l'opération est basé sur une classification en 4 groupes: I—les malades souffrant d'angine intermittente et de peu de conséquence; II—l'insuffisance coronarienne progressive ne causant pas d'invalidité; III—les malades partiellement ou totalement invalides, mais sans angine au repos; IV—la grande angine de poitrine. L'opération est destinée au groupe III. Il va sans dire que le diagnostic d'insuffisance coronarienne doit être d'abord solidement établi. Toute activité pathologique récente dans le myocarde est prise en ligne de compte d'une façon adverse, de même que la dilatation, l'hypertrophie et la défaillance ventriculaire gauche, ainsi que l'hypertension essentielle avancée. L'auteur passe en revue les douze cas qu'il a opérés et offre ses commentaires. M.R.D.

"Leisure can be most aptly described as a period of intelligent but pleasurable relaxation after a long spell of strenuous intellectual work. The idler passes his life in idleness. The manual worker turns from toil to rest. The intellectual worker intersperses his work with leisure, with periods in which his brain is employed but not driven. To such a man leisure is not merely important but essential. During his periods of work he is storing his mind, and storing it so fast and so full that the newly acquired treasures are not properly appraised, sorted, arranged and put to use before others crowd upon them. During leisure there is a chance to catch up. The jumble becomes straight, the blocked channels start to flow again, and the owner comes back to find that, while he was away, the mess he left behind has been arranged for him into a pattern which now seems to have some meaning. Only leisure can rehabilitate the overstressed mechanism of the mind. Drugs bring cessation rather than rest; they put the brake on the machine instead of allowing it to tick over in neutral with the clutch out. Leisure, however, gives it a day in the workshop and allows it a period of overhaul and general tuning; and the work is undertaken by a method that is infinitely expert, because it has been developed by the infallible process of research and rejection during the two billion years that have rolled by since man's first simple ancestors lived on an earth that was without form and void."—Sir Heneage Ogilvie, *The Practitioner*, 172: 75, 1954.

Canad. M. A. J.
April 1954, vol. 70

THE CONTROL OF INFECTIONS IN THE NEWBORN*

A. F. HARDYMENT, M.D.,†
Vancouver, B.C.

THE CONTROL of infections in the newly-born is a challenge to all that have to do with this age group. The size of the problem can be illustrated by the example of our experience at the Vancouver General Hospital. There, in 1952, of 4,639 babies born alive, 8 died of infection, 114 had an apparent skin infection, 47 had oral thrush, 36 had conjunctivitis, 7 had an acute upper respiratory infection, 4 had omphalitis, 3 had diarrhœa, and one each had furunculosis, paronychiæ, mastitis, and meningitis. There were, therefore, 215 babies who were presumed to be infected during this 12 month period.

It is of interest to notice that during this one year infective pneumonia was not diagnosed in any newborn infant who subsequently survived. Six cases of pneumonia were discovered among the eight babies who died of infection. It is also noteworthy that infection caused 12% of the deaths of those live born infants who came to autopsy.

We have been studying the epidemiology and the control of skin infections in our nurseries. Some data on the epidemiology of pyoderma neonatorum have been accumulated, and it is hoped to publish this aspect of our work in the near future. This paper deals with the significant improvement obtained by us in the control of skin infections in our nurseries.

REVIEW OF THE LITERATURE

I would commend to you a review of the subject of infection in the newborn baby by Professor Alan Moncrieff.[1] However, even this scholarly presentation leaves much unanswered about the particular subject of pyoderma neonatorum. Knowledge of the problem of skin infection in the newborn has increased slowly. The *Staph. pyogenes* has not always been thought to be the causative organism,[2] although it was implicated by Matzenauer[3] in 1900. In regard to the presence of pathogenic staphylococci in the nares of neonates, Bloomfield,[4] in 1922, said, "These organisms were found in a few cultures". Since then repeated surveys of the situation have revealed the very frequent presence of this organism in the nose of newborns,[5, 6, 7] being present in this location in 9.5% of babies by the end of the first day, in 50% of babies by the end of the second day, and in 88.8% of babies between the fourth and the 8th days.[6] That the *Staph. aureus* is more prevalent in the noses of hospital personnel, than among the general population, has been repeatedly shown.[8 to 11] Duncan,[12] in 1942, found pathogenic staphylococci in the milk of 90% of nursing mothers.

An increase in the number of staphylococcal infections in the general population has been reported by some authors in Britain,[13 to 18] and from Canada.[19] The *Staph. pyogenes* occurring in nursery infections has been studied by many bacteriological techniques. Recently, their identification by phage-typing has been a popular method.[20 to 28]

Attempts to control nursery skin infections by elimination of dry dusting and the use of oil on the floors,[29] by surgical scrubbing,[9] wearing rubber gloves, masks and gowns,[6, 10] by isolation of all personnel and patients found to be nasal, skin or rectal carriers,[30] and by placing babies with their mothers or in very small groups rather than in large nurseries[31, 32] have all been tried and reported on by various writers. The strict isolation method, proposed by Knott and Blaikley[30] produced good results, but is not practical under the circumstances operating in most hospitals. Taking babies out of large nurseries and placing them in small groups has been suggested as a preventive measure. We are disturbed, however, by the very seriously high incidence of pyoderma neonatorum occurring in a small town, cottage-type hospital, with an average nursery population of 7, that we have recently been studying. It is now generally agreed that the use of rubber gloves by nurses, and the wearing of the usual type of face mask, are at best of doubtful value.

The prophylactic use of antibiotics has, of course, been advocated, including the intra-nasal instillation of penicillin to reduce the incidence of skin contamination. The increasing resistance of hospital staphylococci to penicillin has much decreased the value of this antibiotic both in prophylaxis and in treatment.[7, 11, 19, 34] Aureomycin has more recently been advocated as a routine prophylactic agent.[26, 35, 36] The now well-known ability of the staphylococcus to become resistant to antibiotics makes one wonder how long this agent will remain effective.[11]

I would next like to discuss methods of prophylactic skin care. Ammoniated mercury ointment used as an inunction has been popular,[37] and Potter[2] in 1936 reported an impetigo incidence rate of 19.8 (per 1,000 live births). Sanford's work,[38] published in 1937 was possibly responsible for the popularity of not washing or oiling the baby. This "no-handling" method has been officially recommended by the Committee on the Fetus and the Newborn of the American Academy of Pædiatrics. Parmalee,[39] in 1946, recommended this same principle. In the same year, Corner[40] reported an incidence rate of 59, when daily soap and water bathing was used. I should mention that Moncrieff, in the lecture referred to earlier,[1] stated that he advocates daily soap and water bathing as his personally preferred method. The use of 5% sulfathiazole cream as an inunction has been urged by Weymuller,[41] and supported by others.[42, 43] They show incidence rates of from 9 to 18 in their reports.

Since 1945, various publications on the use of a substance called hexachlorophene have appeared.[42, 44 to 47] This bactericidal agent has been used in soap, in a lotion, and in a detergent. All of these reports claim the virtual disappearance of newborn skin infection, reported rates being as low as 1.4 per 1,000 live births.

MATERIAL FOR PRESENT STUDY

First it is necessary to define to you what we mean by the term, pyoderma neonatorum.

Pustular skin infections in the newborn are generally called impetigo neonatorum, sometimes pemphigus neonatorum and sometimes pemphicoid. We have preferred to use the term pyoderma neonatorum because the other names, impetigo and pemphigus are unsatisfactory. The

*As presented to the Canadian Medical Association Meeting, Winnipeg, Manitoba, June, 1953.

†Clinical Assistant Professor, Department of Pædiatrics, University of British Columbia.

majority of the pustular lesions seen are small, discrete vesicles with a surrounding erythema, containing a cloudy fluid or frank pus. Such lesions are easily broken and leave no scar, neither does crusting occur and seldom are the lesions truly bullous. We have our own definition of pyoderma neonatorum which is as follows: Any lesion one millimetre or more in diameter on the skin which is pustular and from which *Staph. pyogenes* can be cultured.

As will be seen in Fig. 1, the incidence of pyoderma neonatorum in the nurseries of the Vancouver General Hospital reached epidemic proportions in the winter of 1948-49. The peak of this incidence was attained in January 1949, when the rate reached 121 cases per 1,000 live births. Coincidentally with the introduction of control measures, applied in April and May of

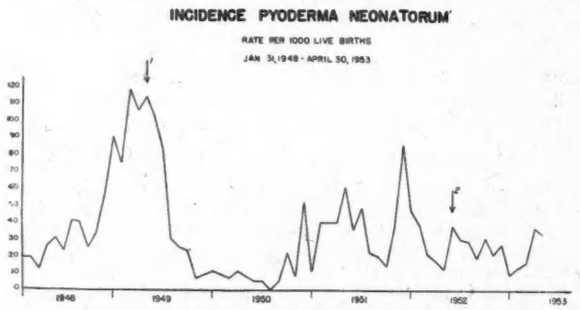


Fig. 1.—Arrow 1—April 1949. Introduction of control measures. Arrow 2—May 1952. Introduction of experimental methods of skin care.

1949, and with the appointment of a physician to be in charge of nurseries, the incidence fell rapidly until in July 1950, no cases were reported. The rate from September 1949, until July, 1950, had ranged between 7 and 15. Then, with no change in our techniques, an increase in the rate occurred, so that in January and February 1951, the rate was 51, and in December 1951, a peak of 90 per 1,000 live births was reached. In April and May, 1949, the following improved nursery techniques were introduced. Barrier examining rooms were built at each nursery, prohibiting the entrance into the nursery of everyone excepting those nurses caring for the babies. All personnel were required to be capped, masked and gowned, and their hands washed with soap and water. Dry dusting in the nurseries was forbidden. All linen used in the nurseries was autoclaved. The common changing table was eliminated. Commencing in June 1949, and continuing until April 30, 1952, every newborn baby has had a complete body inunction at birth with 1% ammoniated mercury in a eucerine base. This inunction has been repeated on the fifth day of life.

It is obvious that these methods have not adequately controlled pyoderma in our newborns. Our rate, although low in part of 1950, has generally been higher than that reported from many other centres. We have not had any serious complications in either the infants or their mothers. There has not been an increase in the number of cases of breast abscess in the mothers such as has been reported from the centres.

From May 1, 1952, until April 30, all the babies born at the Vancouver General Hospital were divided into three groups at birth. In each delivery room one of three types of skin care was instituted. Thus the babies were not selected, but the skin care they were given depended on the delivery room in which they were born. In one delivery room, the baby was treated with the ammoniated mercury technique as has been applied during the previous three years and which was described earlier (Method Z). In another case-room, the baby was anointed at birth with a lotion containing 1% hexachlorophene. The baby so treated had a daily inunction with this lotion in the nursery (Method Y). In yet another case-room, the excess blood and vernix was removed from the face, groins and axillæ with sterile liquid petrolatum and then no other skin treatment was applied to the baby (Method X). None of the babies were bathed. The babies were distributed

TABLE I.

INCIDENCE OF PYODERMA NEONATORUM IN DIFFERENT TREATMENT GROUPS IN THE NURSERIES, VANCOUVER GENERAL HOSPITAL—MAY 1, 1952 - APRIL 30, 1953

Culture results	*Staphylococcus coagulase positive*	*Staphylococcus coagulase negative*	*No growth*	*No culture but typical clinically*	*Total*
Type of treatment					
X	43	3	4	3	53
Y	5	0	16	0	21
Z	23	6	9	1	39
Total:	71	9	29	4	113

Type of treatment	*Babies treated*	*Babies receiving no treatment*	*Total live births*
X	1506	87	
Y	1517		
Z	1466		
Total:	4489	87	4576

in the usual way throughout the nurseries, so that they were all exposed to equal risk of infection in the nurseries, whatever that risk might have been.

Table I will show you that of 4,576 babies born in this 12 month period, we had to eliminate 87 from our series because they were too ill, or too small, or for other various reasons, leaving 4,489 babies at risk. These were fairly evenly divided between the three skin methods. Clinical pustule-like lesions were discovered and cultured in 53 of the non-treatment group, 39 in the ammoniated mercury group, and 21 in the hexachlorophene group. However, we feel that the true significance of this clinical experiment lies in reporting on the number of cases developing pustules from which we could culture the *Staph. pyogenes*. In the others, either no organism was found, or other organisms, usually the *Staph. albus*, generally considered non-pathogenic, were grown. The cultures were taken from unbroken pustules with a Pasteur pipette, so far as possible by one technician.

TABLE II.

INCIDENCE OF PYODERMA NEONATORUM IN DIFFERENT TREATMENT GROUPS IN THE NURSERIES, VANCOUVER GENRAL HOSPITAL—MAY 1, 1952 - APRIL 30, 1953

Type of treatment	*Babies treated*	*Pustules culturing coagulase positive staphylococci*	*Coagulase positive staphylococci in pustules: rate per 1000 babies treated*
X	1506	43	28.5
Y	1517	5	3.3
Z	1466	23	15.5
Total:	4489	71	15.8

A very few were not cultured because the lesions had broken before this could be done. True cases of pyoderma, lesions from which could be cultured a pure growth of *Staph. pyogenes*, occurred in 43 treated by "non-inunction", 23 treated with ammoniated mercury, and in only 5 treated with hexachlorophene in a lotion.

Table II shows the same information expressed in rates per 1,000 babies treated. We have discovered that in our hospital, with our nursery facilities, it is necessary to apply some prophylactic to the skin. Without prophylaxis, the infection rate of 28.5 is produced, which we consider too high. This rate is halved (15.5) when 1% ammoniated mercury is applied. The application of hexachlorophene in a lotion almost eliminates (3.3) this infection.

Fig. 2 presents the same results in graphic form. The heavy black line portrays the average incidence rate for all babies treated. Note that the ammoniated mercury method roughly approximates this average. The "non-inunction" method produced a pyoderma incidence higher than the average in almost every month. The hexachlorophene method produced a pyoderma incidence that was consistently very low.

At the present time we are observing the efficiency of other skin methods. We are subjecting them to the same rigid control. So far we have no evidence that the staphylococcus can become resistant to hexachlorophene.

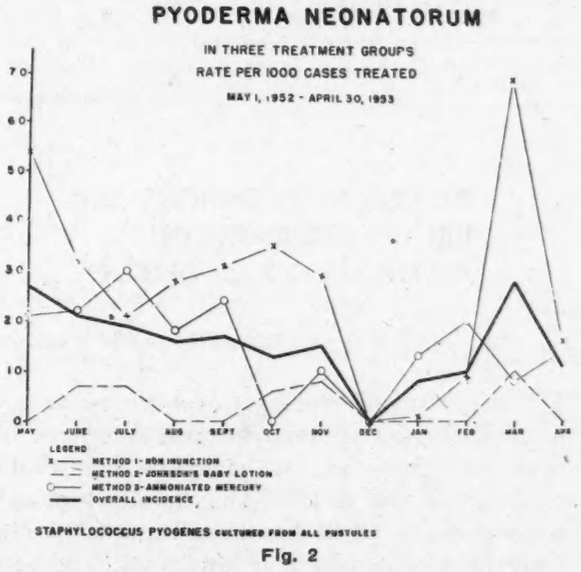


Fig. 2

SUMMARY

1. Experience of the Maternity Department of the Vancouver General Hospital, relating to all nursery infections, and in particular in pyoderma neonatorum, has been described.

2. The medical literature has been reviewed and a bibliography prepared.

3. A definition of pyoderma neonatorum has been suggested.

4. A preliminary report of our studies of various methods of prophylactic skin care to the newly born has been given.

The data on the epidemiology on pyoderma neonatorum will be published under the authorship of Hardyment, A. F., Wilson, R. A., and Cockcroft, W. H. This work has been done under the Federal Health Grant, Research Project No. 609-7-5.

REFERENCES

1. MONCRIEFF, A.: *Brit. M. J.*, 1: 1, 1953.
2. POTTER, R. T. AND ABEL, A. R.: *Am. J. Obst. & Gynec.*, 31: 1003, 1936.

3. MATZENAUER, quoted by McCandlish, H. S.: *Am. J. Obst. & Gynec.*, **9**: 228, 1925.
4. BLOOMFIELD, A. L.: *Bull. Johns Hopkins Hosp.*, **33**: 61, 1922.
5. KNEELAND, Y.: *J. Exp. Med.*, **51**: 617, 1930.
6. TORREY, J. C. AND REESE, M.: *Am. J. Dis. Child.*, **69**: 208, 1945.
7. MARTYN, G.: *Brit. M. J.*, **1**: 710, 1949.
8. MCFARLAN, A. M.: *Brit. M. J.*, **2**: 939, 1938.
9. GILLESPIE, E. H., DEVENICH, C. A. AND COWAN, S. T.: *Lancet*, **2**: 871, 1939.
10. ELLIOTT, S. D., GILLESPIE, E. H. AND HOLLAND, E.: *Brit. M. J.*, **1**: 169, 1941.
11. WILSON, R. A. AND COCKCROFT, W. H.: *Canad. M. A. J.*, **66**: 548, 1952.
12. DUNCAN, J. T. AND WALKER, J.: *J. Hyg.*, **42**: 474, 1942.
13. BENIANS, T. H. C.: *Brit. M. J.*, **1**: 623, 1943.
14. FULTON, A. A.: *Lancet*, **1**: 693, 1945.
15. GOTTLIEB, I.: *Lancet*, **2**: 808, 1947.
16. BOURNE, I. H. J.: *Lancet*, **2**: 892, 1947.
17. WHITWELL, G. P. B. AND SUTHERLAND, I.: *Brit. J. Dermat. & Syph.*, **62**: 109, 1950.
18. HARRISON, M. H. M.: *Lancet*, **2**: 727, 1948.
19. MCLETCHIE, N. G. B.: *Canad. M. A. J.*, **60**: 352, 1949.
20. FISK, A.: *Brit. J. Exper. Path.*, **21**: 311, 1940.
21. CADUESS-GRAVES, B. *et al.*: *Lancet*, **1**: 736, 1943.
22. WILSON, G. S. AND ATKINSON, J. D.: *Lancet*, **1**: 647, 1945.
23. WILLIAMS, R. E. O.: *J. Path. & Bact.*, **58**: 259, 1946.
24. PARKER, M. T. AND KENNEDY, J.: *J. Hyg.*, **47**: 219, 1949.
25. COLBECK, J. C.: *Canad. M. A. J.*, **61**: 557, 1949.
26. MCGUINNESS, F. G. AND MUSGROVE, G. S.: *Canad. M. A. J.*, **61**: 356, 1949.
27. ROUNTREE, P. M. AND BARBOUR, R. G. H.: *M. J. Australia*, **1**: 525, 1950.
28. *Idem*: *J. Path. & Bact.*, **63**: 313, 1951.
29. THOMAS, J. C.: *Lancet*, **2**: 123, 1941.
30. KNOTT, F. A. AND BLAIKLEY, J. B.: *J. Obst. & Gynæc. Brit. Emp.*, **51**: 386, 1944.
31. ALLISON, V. D. AND HOBBS, B.: *Brit. M. J.*, **2**: 1, 1947.
32. FRAZER, M. J. L.: *Arch. Dis. Child.*, **23**: 107, 1948.
33. MOSS, B., SQUIRE, J. R. AND TOPLEY, E.: *Lancet*, **1**: 320, 1948.
34. BERTOYE, A. AND CARRAZ, M.: *J. de méd. de Lyon*, **32**: 765, 1951.
35. DEPANE, A. J. AND MCEWEN, D. S.: *Canad. M. A. J.*, **65**: 439, 1951.
36. FELDMON, F. AND ANNUNZIATA, D.: *J. Pediat.*, **41**: 399, 1952.
37. CHADWELL, O. R.: *New England J. Med.*, **199**: 983, 1928.
38. SANDFORD, H. N.: *J. Pediat.*, **11**: 68, 1937.
39. PARMALEE, A. H.: *Med. Clin. North America*, p. 17, January, 1946.
40. CORNER, B.: *Proc. Roy. Soc. Med.*, **39**: 383, 1946.
41. WEYMULLER, C. A., BECK, A. C. AND ITTNER, E.: *J. A. M. A.*, **133**: 1, 1947.
42. GLASER, J., THOMSON, M. L. AND BENSON, T. D.: *Am. J. Dis. Child.*, **81**: 329, 1951.
43. LEE, *et al.*: *J. Pediat.*, **41**: 159, 1952.
44. GUILD, B. T.: *Arch. Dermat. & Syph.*, **51**: 391, 1945.
45. TRAUB, E. F., NEWBALL, C. A. AND FULLER, J. R.: *Arch. Dermat. & Syph.*, **52**: 385, 1945.
46. ALLERS, O. E., HUBBELL, J. P. AND BUCK, D. S.: *Am. J. Obst. & Gynec.*, **60**: 431, 1950.
47. FARQUHARSON, C. D. *et al.*: *Canad. M. A. J.*, **67**: 247, 1952.

NEWBORN INFECTIONS AND BREAST ABSCESSES OF STAPHYLOCOCCAL ORIGIN*

JEAN F. WEBB, M.D., D.P.H.,† *Ottawa*

THE HOSPITALS of Winnipeg experienced an unusual incidence of staphylococcal infections of newborn infants and of puerperal breast abscesses from 1947 to 1951. The experience of one hospital during 1949 has been reported previously by McGuinness and Musgrove.[1] The first use of bacteriophage typing of staphylococci in the investigation and control of the epidemic has been reported by Colbeck.[2] The year 1948 was the peak year of the outbreak, 1950 a quiet year with a low incidence of infection in all hospitals. There was evidence late in 1950, however, that the infection was still present and an epidemiological investigation was planned but was delayed in starting until the fall of 1951. At that time it was apparent that two hospitals of the city had had an unusual incidence of the disease in 1951, and the following is an analysis of the available information concerning these outbreaks.

An association of purulent infections of newborns and puerperal breast infections has been reported recently by Jeffrey,[3] Pyle,[4] and Isbister,[5] as well as the reporters of this outbreak. The use of bacteriophage typing of staphylococci in investigations of nursery infections has been reported by Williams,[6] Allison and Hobbs,[7] Miller[8] and Parker and Kennedy.[9] The outbreaks to be reported followed this pattern.

Very early in the outbreak it was established that the causative organisms were coagulase positive staphylococci and in 1948 bacteriophage typing was introduced to aid in the identification of the staphylococci. Dr. J. C. Colbeck, Director of the Laboratory Services of the Province of Manitoba at that time, prepared a bacteriophage which lysed a high proportion of the staphylococci isolated from pathological material from September, 1948 to May, 1949. This phage he designated as W. The method of bacteriophage typing of staphylococci now in use was initiated by Dr. G. B. Leyton some months after he became Director of Laboratory Services. An article by Dr. Leyton,[10] on the resistance to antibiotics of staphylococci isolated at the laboratory, appeared in 1952. Since late February 1951, 23 bacteriophages have been used with the result that the identification of staphylococci has become more precise. Some of these bacterio-

*This is part of the report made to the Committee on Staphylococcal Infections of the Section of Obstetrics and Gynæcology of the Winnipeg Medical Society under the chairmanship of Dr. Henri Guyot. The investigation was conducted by personnel of the Department of National Health and Welfare at the request of this Committee and was supported by funds supplied by Federal Health Grants.

†Acting Chief, Division of Child and Maternal Health, Department of National Health and Welfare.

phages were obtained from the Streptococcus and Staphylococcus Reference Laboratory of Dr. R. E. O. Williams of the Public Health Laboratory Service in England. Others are mutated phages prepared in the provincial laboratory in Winnipeg. Staphylococci isolated from infections are still frequently found to be lysed by phage W, but other phage reactions of the organisms indicate that there are several organisms involved which have similar though not identical phage reactions. The identification of staphylococci by bacteriophage typing has been of inestimable value in the investigation of this infection.

HOSPITAL I

At the time this investigation was initiated there was an outbreak of breast abscesses manifesting itself among patients delivered in this hospital in August 1951. The first patient readmitted to the hospital for incision of a breast abscess had been delivered on August 4, and the largest number of patients with abscesses was delivered the week of September 3-9.

Cases admitted to hospital for abscess incision were reported to the survey group on special report forms and the data on them are fairly uniform. The data on incidence of infant skin infections in hospital during the epidemic period were collected in retrospect from a review of individual hospital records. Skin infections and a few other purulent infections were diagnosed from the nurses' descriptions of the lesions as recorded on the daily record. Such non-specific descriptions as redness, irritation and roughness were not included. The lesions were described as blebs in the first two or three weeks of the outbreak, then as pustules. They were frequently described in the axillæ, groins, and neck, areas of predilection for bullous impetigo of the newborn. Table I summarizes the incidence of maternal breast abscesses and newborn purulent infections, according to the week of delivery.

Clinical data.—Since 27 of these abscesses were reported on a special form, other related data were collected. From this it was determined that age distribution, parity and the amount of prenatal care of mothers were not unusual. The average length of time from delivery to incision of the abscess was 47.5 days. Twenty-six of the mothers had discontinued nursing by eight weeks post-partum. Infection was given as the common reason for discontinuance, 13 stopped nursing because of breast infection, two because of infant infections. Other reasons cited were cracked nipples and insufficient milk.

Because of the prevalence of breast feeding among mothers in Winnipeg hospitals, at least during the first few days post-partum, it was not possible to study the incidence of breast infection in a comparative series of mothers who had not nursed their infants at all.

An analysis of the data on infants of these mothers revealed that all the infants were full term, and that 25 of the 27 infants had received no prophylactic antibiotic while in hospital. Seventeen of the infants had had purulent infections, six in hospital and eleven at home.

Because an increase in skin infections among newborn infants in hospital nurseries had usually preceded the appearance of breast abscesses in mothers it was thought probable that infants were the source of infection of mothers. As noted above, a high proportion of infants of mothers who subsequently developed breast abscesses had skin infections. A comparison was therefore sought with the infants of a control group of mothers delivered at the same hospital at the same time who did not develop breast infections. Public health nurses of the four districts of the City of Winnipeg, without knowledge of the purpose of the survey, were asked to select ten infant records at random from those delivered at Hospital I in August and September. Thirty-eight of the mothers of these infants had had no breast infections. Data are summarized in Table II.

TABLE I.

STAPHYLOCOCCAL INFECTIONS OF INFANTS AND MOTHERS, BY WEEK, HOSPITAL I, AUGUST-SEPTEMBER 1951

Date of delivery	*Live births*	*Infant infections*		*Maternal breast abscesses*	
	No.	*No.*	*% of L.B.*	*No.*	*% of L.B.*
August					
J30 - 5	76	2	2.6	1	1.3
6 - 12	61	5	8.2	4	6.6
13 - 19	69	12	17.4	4	5.8
20 - 26	69	4	5.8	7	10.1
September					
A27 - 2	50	8	16.0	5	10.0
3 - 9	71	11	15.5	10	14.1
10 - 16	52	5	9.6	0	0
17 - 23	62	3	4.8	0	0
24 - 30	75	3	4.0	0	0
Totals:	585	53	9.1	31	5.3

This difference in rates of infant infections in mothers with and without abscess is statistically significant.

Prophylactic antibiotic.—Early in September pædiatricians noted that infants were developing pustular skin infections after discharge from the hospital. For this reason the administration of prophylactic antibiotic to infants in hospital was resumed on September 10. Prophylactic antibiotic which had been reported of value in the control of a previous outbreak in 1949 had not been given in this hospital since March 1951.

TABLE II.

RELATIONSHIP OF INFANT TO MATERNAL INFECTIONS

	Infants			*Mothers*
Mothers	*Infection*	*No infection*	*Total*	*% with infected infants*
Abscess	17	10	27	63%
No abscess	6	32	38	16%
Totals:	23	42	65	

Chloromycetin was administered orally in a dose of 25 mgm. four times a day, suspended in a glucose solution. Infants continued to receive the drug until November 4 when it was discontinued, but following the occurrence of a few skin infections in the nursery it was resumed on November 23 and continued until March 12, 1952.

Bacteriology.—The proportion of maternal and infant infections cultured and phage typed at the provincial laboratory was not large. Of 31 breast abscesses, 9 were cultured and phage typed at the provincial laboratory, or 29%; of the 53 newborn skin infections which occurred, 13 were cultured and phage typed, or 25%. While 17 of the mothers who developed abscesses are known to have had infants with purulent infections, only one mother-child combination had complete bacteriological studies.

As mentioned above, the bacteriophages from the Staphylococcus Reference Laboratory of Dr. R. E. O. Williams were supplemented by other mutated phages prepared in the provincial laboratory in Winnipeg. These are phages 939, 939A, 948, 971, 977, 1272, 1272N, 1791 and W. Phage 971 sometimes reacts with Williams' 42; W is 57 in Williams' classification. Bacteriological findings are summarized in Tables III and IV.

TABLE III.

INFANT INFECTION BACTERIOLOGY

Phage types	*Number*
977/1272N/1791/W	9
977/1272N/W	3
939/977/1272N/W	1
	13

TABLE IV.

BREAST ABSCESS BACTERIOLOGY

Phage types	*Number*
977/1272N/1791/W	5
939/977/1272N/1791/W	4
	9

Both the mother and infant of the only *pair* for whom data were available were infected by coagulase positive staphylococci of phage type 977/1272N/1791/W.

Carriers of the epidemic strain.—During late August and early September a nose and throat survey for staphylococcal carriers was carried on in the maternity department. Sixty persons were so examined. Of these, two members of the nursery staff, a supervisor and a nurses' aide, were found to be carrying the organisms subsequently identified from breast abscesses. Early in October nose and throat swabs were repeated. At this time the nurses' aide was found to be positive again for the same organism, but the nursery supervisor was negative. The nursery supervisor had been on vacation from August 26 to September 10, while the nurses' aide was on duty continuously in September. The nurses' aide carried the organism 977/1272N/1791/W which was isolated from nine of the infant infections and five of the breast infections, or 63% of the cultured infections. She was removed from nursery duty on October 5.

DISCUSSION

The pattern of this outbreak of breast abscesses is of interest because of its sharp rise and sudden drop from the peak weekly incidence of 14% in one week to zero the following week. As

far as could be determined, there were no changes in nursing technique, in nursing personnel or in the number of mothers nursing their infants, to account for the sudden drop in incidence. The only change in the routine was the administration of prophylactic chloromycetin to babies and, in the absence of any other factor, this must be considered of significance. On the other hand, it is difficult to account for the fact that a considerable proportion of infants continued to develop purulent infections even though the incidence did decrease. It would appear that the drug reduced the bacterial flora of the infants' noses and throats while not affecting skin and other infections to the same degree.

The data on incidence of infections in infants of mothers who developed breast abscesses and those who did not are significant statistically, and confirm the observed relationship between infant and maternal infections.

The proportion of infant and maternal infections which were cultured and phage typed was not large, 25% of the former, and 29% of the latter. The results are of interest. The breast abscesses cultured were caused by two strains of hæmolytic staphylococcus aureus differing in phage type. One of these phage types was responsible for 9 of the 13 infant infections and, with a minor variation, for three more. The phage type of the organism of the last infant infection was closely related to the strain causing the remaining breast abscesses.

It was of interest in comparing this outbreak with that at Hospital II to note that the proportion of carriers of the infecting strains was small; only two persons were found to be carriers, one of each of the predominant strains. Sixty-three per cent of the infections in which bacteriological cultures were obtained were caused by the same strain carried by the nurses' aide who was on duty during the whole course of the outbreak.

HOSPITAL II

It was obvious from an examination of the monthly rates of incidence by hospital that this hospital had an unusual incidence of breast abscesses among mothers delivered there in the first six months of 1951. This outbreak reached its peak among patients delivered in May and June. This, together with the fact that more bacteriological studies of both infections and carriers were done in this period, indicated the value of examining the pattern of the outbreak over these two months.

These breast abscess cases were not reported on the form developed later so that the data on them are limited to the date of delivery, date of incision and bacteriological data for those cultured and phage typed at the provincial laboratory. Data on the incidence of infant infections which occurred in hospital were collected as above, in retrospect, from a review of individual hospital records. Skin infections and a few other purulent infections were diagnosed from the nurses' descriptions of the lesions as recorded on the daily record. Non-specific descriptions, such as redness or irritation, were not included unless they occurred in two or more areas of predilection for skin infections or were accompanied by other signs, such as eye or nasal discharge. Table V summarizes the incidence of infant infections and maternal breast abscesses as a percentage of total deliveries per week for the two-month period.

TABLE V.

STAPHYLOCOCCAL INFECTIONS OF INFANTS AND MOTHERS, BY WEEK, HOSPITAL II, MAY - JUNE, 1951

Date of delivery	*Live births*	*Infant infections*		*Maternal breast abscesses*	
	No.	*No.*	*%*	*No.*	*%*
May A30 - 6	38	14	36.8	3	7.9
7 - 13	48	10	20.8	5	10.4
14 - 20	35	10	28.6	4	11.4
21 - 27	45	11	24.4	6	13.3
June M28 - 3	39	18	46.1	6	15.4
4 - 10	34	15	44.1	4	11.8
11 - 17	41	13	31.7	4	9.8
18 - 24	39	8	20.5	1	2.6
25 - 1	32	6	18.7	0	0.0
Total:	351	105	29.9	33	9.4

Prophylactic antibiotic. – Antibiotics had not been administered to all infants as a prophylactic measure at Hospital 2 since November 1950. On June 4, 1951, it was resumed. Chloromycetin was given to all infants during their hospital stay, 25 mgm. q.i.d. All infants continued to receive the drug until July 23, 1952. Of 63 infants delivered up to June 4 who developed infections, 35 had received antibiotic, most of them therapeutically but a number prophylactically as indicated by the fact that drug was administered on the first or second day of life before lesions appeared. This is in contrast

to Hospital I where antibiotic was administered to only 6 of the 53 infected infants. The incidence of both infant infections and breast abscesses declined after the resumption of chloromycetin, but the fall was gradual, abscesses declining a little ahead of the skin infections.

Bacteriology.—A high proportion of the breast abscesses among patients delivered in this period were cultured and phage typed at the provincial laboratory. Twenty-seven of the 33, or 82% of the abscesses which occurred were phage typed. Of the 105 infant infections which occurred only 19, or 18%, were cultured and phage typed, most of these from infants delivered in June. Findings are summarized in Tables VI and VII.

TABLE VI.

INFANT INFECTION BACTERIOLOGY

Phage type	*Number*
939/977/W	16
W	1
939/977/1272N/W	1
7/47/53/54/971	1

TABLE VII.

BREAST ABSCESS BACTERIOLOGY

Phage type	*Number*	
939/977/W	13	
939/977/1791/W	7	
939/977/1272N	2	
939/977/1272N/1791/W	1	
977/W	2	
6/47	1	
Non-typable	1	(which occurred with 939/977/1791/W).

Of the 16 infants infected in June whose lesions were cultured and phage typed, 4 had mothers with breast abscesses which were cultured.

TABLE VIII.

COMPARISON OF BACTERIOLOGY OF INFANT AND MATERNAL INFECTIONS

Infant infections		*Maternal infections*	
Phage type	*Number*	*Phage type*	*Number*
939/977/W	4	939/977/W	2
		939/977/W and 939/977/1791/W	2

Carriers of the epidemic strain.—During May, June and July the maternity and nursery staff of this hospital were surveyed for carriers of staphylococci. A total of 96 persons were examined, some of whom worked elsewhere in the hospital. Fourteen carriers of the strain currently causing abscesses and infant infections were found, most of them among nursery personnel.

TABLE IX.

CARRIER BACTERIOLOGY

Phage type	*Number*
939/977/W	8
939/977/1272N/W	6
	14

DISCUSSION

The pattern of this outbreak differed from the one at Hospital I because it showed a more gradual rise over several months to a peak incidence of breast abscesses in the first week of June of 15.4%, with a gradual fall to zero in the fourth week of June. Infant infections, as in the other outbreak, decreased gradually. There was little change in the pattern with the resumption of the administration of prophylactic antibiotic to infants on June 4, but, as was pointed out, a number of infants had been receiving the drug on their individual doctor's orders prior to administration to all infants, and this clouded the issue.

The proportion of abscesses cultured and phage typed was 82%, considerably higher than for the previously described outbreak. Only 18% of infant infections were cultured, most of them occurring in June. The breast abscesses were caused by four strains of staphylococci, one strain with minor phage variations accounting for 23 of the 27. Seventeen of the 19 infant infections were caused by the same strain. Four mother-infant infections were cultured and phage typed; the common strain was isolated from all of these infections.

A high proportion of maternity unit personnel were found to be carriers of the above infecting strain, and most of them were on nursery duty. It was not possible to determine, due to the lack of repeat swabs, how many of these were chronic carriers and how many were transient carriers, a reflection of the highly infected environment in which they were working at the time.

Hospital facilities and techniques.—An assessment of nursery facilities and techniques in these hospitals was made in October and November, 1951, by Miss Ruby I. Tinkiss, at that time

Nursing Consultant to the Division of Child and Maternal Health, Department of National Health and Welfare. In general these hospitals had better physical facilities and practised a more individual technique of infant care than the other hospitals of the city. However, since these assessments were made some months after the outbreaks had subsided it is not possible to draw conclusions regarding relationships between nursery techniques and the epidemics.

CONCLUSIONS

1. It would appear that at epidemic periods maternal breast infections are of hospital origin. The infant, infected in the nursery, in a high proportion of cases seems to be the most likely means of spread to the mother. Whether or not it is necessary that the mother's breast be infected by direct inoculation during nursing was not indicated in this study.

2. Bacteriophage typing of staphylococci is an invaluable aid in the study of such an epidemic. Without it, bacteriological study of the problem would be of little value. At epidemic periods the similarity of phage types of organisms isolated from infants and mothers is further suggestive of this route of spread, but final confirmation awaits the bacteriological study of infections in a large group of mother-infant pairs.

3. The use of prophylactic antibiotic would appear to have had some value in limiting the outbreak at Hospital I. There seems to be no justification for its administration for long periods of time after an outbreak has subsided.

4. Apparently it is not necessary that there be a high proportion of carriers of an epidemic strain in a nursery for an outbreak of this infection to occur since at Hospital I an outbreak was associated with the presence of only two carriers. In Hospital II nursery, 11 carriers were found during an epidemic period. However, since carrier studies in Hospital II were done at a time when the infection had been present for several months they should not be compared to the carrier studies at Hospital I, done within a few weeks of the first appearance of the infection. It seems highly probable that a number of carriers at Hospital II were transient carriers, a reflection of the highly infected environment in which they were working at the time of study. The elimination of chronic carriers from the nursery environment would seem to be a fundamental procedure in the control of any outbreak. The earlier such carriers are identified and removed, the more effective a factor in control should their removal be. At the height of an outbreak of infant infections in a nursery the number of infections spread by carriers is probably small compared to the number of cross infections between infants. A carrier study should be done immediately when infant infections occur so that if a common strain is isolated from the infections there will be no need of further delay in identifying the carriers of it.

5. Although at the time of the investigation no direct relationship could be established between hospital facilities and techniques and the incidence of infection, this should not be interpreted to mean that these factors are not considered important. It is still felt that hospital facilities and particularly the quality of nursing care are very important factors in limiting the spread of infection in hospitals.

On the basis of the above findings a procedure is suggested for the investigation and control of an outbreak of staphylococcal infection in a newborn nursery. This is outlined as follows:

PROCEDURE FOR INVESTIGATION AND CONTROL OF AN EPIDEMIC OF STAPHYLOCOCCAL INFECTION IN A NEWBORN NURSERY

Investigation. — 1. Organisms isolated from infant skin lesions, particularly vesicular lesions, should be cultured, phage typed and examined for antibiotic sensitivities.

2. Organisms isolated from the nose and throat in a sample of infants should be cultured and phage typed.

3. Notification by letter or other means should go to staff physicians emphasizing the need of having pustular infections of infants and mothers cultured and phage typed.

4. Organisms isolated from a survey of noses and throats of nursery staff should be cultured and phage typed.

5. Organisms isolated from dust and linen should be cultured and phage typed to confirm airborne spread at epidemic periods.

6. Nursery procedures and techniques for infant care should be reviewed.

Control.—(1) Infected infants should be removed to an isolation nursery to be cared for by separate staff. Admissions of new infants to infected nursery should be stopped.

(2) An appropriate antibiotic should be administered to infants while in hospital. This

should be withheld until procedures 1 and 2 of the investigation have been carried out.

(3) Deficiencies in procedures and techniques of infant care should be corrected by strict supervision.

(4) Personnel who have been repeatedly shown to be carriers of the same phage type as those causing the infections should be removed from the nursery.

(5) Detergent preparations containing hexachlorophene have been reported to be of considerable value in reducing the staphylococcal flora of nursery environments. They are probably to be preferred to other preparations.

Grateful acknowledgment is made of the co-operation of the Winnipeg hospitals, particularly personnel of the record rooms, also of the co-operation of the Manitoba Department of Health and Public Welfare, Dr. Maxwell Bowman, Director Preventive Medical Services and Drs. G. B. Leyton and Leslie P. Lansdown responsible for the bacteriophage typing of the staphylococci.

REFERENCES

1. MCGUINNESS, F. G. AND MUSGROVE, A. S.: *Canad. M. A. J.*, 61: 356, 1949.
2. COLBECK, J. C.: *Canad. M. A. J.*, 61: 557, 1949.
3. JEFFREY, J. S.: *Edin. Med. J.*, 54: 442, 1947.
4. PYLE, L. R.: *Am. J. Obst. & Gynec.*, 55: 676, 1948.
5. ISBISTER, C.: *M. J. Australia*, 2: 801, 1952.
6. WILLIAMS, G. C., SIMS-ROBERT, C. AND COOK, G. T.: *Monthly Bull. Ministry of Health and Public Health Laboratory Service*, 6: 13, 1947.
7. ALLISON, V. D. AND HOBBS, B. C.: *Brit. M. J.*, 2: 1, 1947.
8. MILLER, A. A.: *J. Obst. & Gynæc. Brit. Emp.*, 57: 415, 1950.
9. PARKER, M. T. AND KENNEDY, J.: *J. Hyg. Camb.*, 47: 213, 1949.
10. LEYTON, G. B.: *Canad. M. A. J.*, 67: 20, 1952.

RÉSUMÉ

Dans deux hôpitaux de Winnipeg, les années de 1947 à 1951 furent marquées par de nombreuses infections à staphylocoque chez les nouveaux-nés ainsi que par plusieurs abcès du sein en lactation. Le typage du microbe fut établi au moyen du bactériophage. Comme l'augmentation des infections cutanées des nourrissons devançait habituellement l'apparition des abcès du sein chez les mères, il en fut conclu que les enfants avaient été la source de l'infection des mères. La chloromycétine fut administrée à titre prophylactique avec des résultats appréciables. Des recherches épidémiologiques montrèrent que dans un des deux hôpitaux, une aide garde-malade était porteuse de germes; sa flore nasale comprenait une variété de staphylocoque qui avait été isolée dans 63% des infections décrites plus haut. Dans l'autre hôpital, non moins de 14 porteurs de germes furent découverts. Une des mesures fondamentales dans le contrôle de toute épidémie de ce genre est évidemment l'élimination de ces gens du personnel des garderies. Des procédés de dépistage et de contrôle en cas d'infections à staphylocoque dans les pouponnières sont suggérés et leur validité est évaluée à la lumière de leur application dans ces deux épidémies. M.R.D.

PENICILLIN SENSITIVITY*

C. COLLINS-WILLIAMS, M.D., F.R.C.P.[C] and J. E. VINCENT, M.D., *Toronto*

WITH THE WIDESPREAD use of penicillin, reports of sensitivity reactions to this drug are becoming alarmingly numerous.[1, 2] The incidence of reactions, as reported by various authors,[3 to 6] varies from 2 to 10%. Many of the reactions are mild and need cause little concern to the patient or physician at the time except for the difficulty of knowing whether it is safe to administer the drug subsequently, but many are of a serious nature and sometimes fatal. The mild reactions include skin rashes which may take the form of urticaria, angioneurotic œdema, dermatitis, scarlatiniform eruptions, morbilliform eruptions, dermatophytosis-like reactions, atopic dermatitis, fixed drug eruptions, and, in fact, practically any type of skin eruption. Of these the most common type is urticaria which typically occurs about 10 days after the administration of the drug and may be accompanied by a "serum sickness-like" reaction with arthralgia, swelling of the joints and fever.

Other types of mild reactions include sore mouth, hairy tongue, perlèche, cheilitis, vasomotor rhinitis, conjunctivitis, blepharitis, and drug fever. Any one of these reactions may, on occasion, be severe. The urticaria, for example, may persist for years after discontinuation of the drug, causing considerable disability to the patient and considerable difficulty in treatment. Other skin manifestations may also be very disabling; these include purpura (thrombopenic and non-thrombopenic) exfoliative dermatitis, and flaring of existing dermatoses. Asthma, Loeffler's syndrome, collagen disease, periarteritis nodosa, convulsions and encephalitic symptoms, photosensitivity, hæmaturia, renal dysfunction with albuminuria and cylinduria, œdema of the pharynx and larynx and both non-fatal and fatal anaphylactic shock are all serious sensitivity reactions which have been reported as due to penicillin.

*From the Allergy Clinic, Hospital for Sick Children, Toronto and the Department of Pædiatrics, University of Toronto.

The literature does not give a true picture of the incidence of fatal anaphylactic reactions. Up to the present time only 14 cases have been reported,[6 to 14] one of which was in a child and the others in adults. However, an editorial in the *Journal of Allergy*[15] refers to four fatal anaphylactic reactions which up to that time had not been reported and we know of two others which have been reported in Toronto newspapers. It is probable that there are many others which have not found their way into the medical literature.

There are a great many factors which influence the development of sensitization to penicillin in a given patient. The frequency of previous exposure to therapeutic penicillin is important though manifestations of sensitivity on the first known exposure have been reported.[16] The route of administration is also important. Keefer[17] states that the lowest incidence of reactions is associated with oral therapy and the highest incidence of reactions occurs in those who have had penicillin applied to inflamed skin. Feinberg[3] states that allergic reactions from topical penicillin have been so numerous that this route of administration has been virtually abandoned. Of the 14 reported cases of fatal anaphylactic shock, 12 deaths followed intramuscular injection, one followed intravenous injection and in the other report the route was not stated. Friedlaender and Friedlaender[18] point out that many of the reactions in the early days of penicillin therapy were undoubtedly related to impurities, and that many individuals who reacted violently to earlier preparations can tolerate present commercial aqueous suspensions without untoward effect. Keefer[17] states that the incidence of reactions is twice as high in those patients who are allergic to other things. While claims have been made that patients who are allergic to moulds show a higher incidence of sensitivity to penicillin, this has not been borne out by studies by Feinberg[3] and by Friedlaender and Friedlaender.[18] Claims have also been made that a patient who cannot tolerate one type of penicillin can tolerate another type. However, Feinberg[3] doubts whether there is a distinct specificity to the different types of penicillin. He suggests that much of the opinion that such a difference in antigenicity and specificity exists is based on observations on the ability of a patient to tolerate one type of penicillin after an allergic reaction has resulted from another type. However, frequently penicillin is tolerated with impunity after a previous "serum sickness" from the same type of drug, so such conclusions cannot be substantiated. Risman and Boger,[19] by skin tests, have demonstrated considerable cross reactions between penicillins G, BT and O.

Considerable work has been done on skin testing with penicillin in an attempt to correlate positive tests with clinical sensitivity. While many of these reports are conflicting the general consensus is that patch tests are helpful in the diagnosis of contact dermatitis due to penicillin, and that positive scratch or intradermal tests occur more frequently in individuals who are clinically sensitive to penicillin than in those individuals who are not, but that, since a negative skin test may be found in an individual who is acutely sensitive to penicillin, skin testing with penicillin is not reliable for routine clinical use prior to the administration of penicillin. Therefore, history and clinical observation are the main criteria for the diagnosis of penicillin sensitivity.

Clinical observations. — Most pædiatricians claim that they see penicillin reactions infrequently whereas most internists feel that these reactions are much more common. In an attempt to assess this we have searched for reactions to penicillin at the Hospital for Sick Children, Toronto, where there are approximately 18,000 indoor admissions and 83,000 outpatient admissions each year. Penicillin is used in large amounts. For example, in a representative week in 1953 a total of approximately 1,600 injections of penicillin were given to 224 patients. In spite of this amount of penicillin used, we have been able to find only 3 reactions which we feel can be definitely attributed to penicillin sensitivity, although we found 5 other probable reactions and 16 possible reactions which we could not substantiate by a study of the hospital records. Of the 3 patients, 2 suffered severe urticaria of short duration, and one a severe prolonged illness characterized by urticaria, conjunctivitis, angioneurotic œdema, pharyngeal ulceration and photophobia. There were no cases of anaphylactic shock. During the time of this study we found 7 adults on the hospital staff who show definite clinical sensitivity to penicillin, thus confirming the impression that penicillin sensitivity is a great deal more common in adults than in children.

In an attempt to assess skin tests with penicillin, 200 children were skin tested with aqueous

penicillin* and related moulds. Two-thirds of these children were "non-allergic" children chosen at random from the indoor and outpatient departments of the hospital who had no history of major or minor allergy. The remaining one-third were allergic children who were attending the Allergy Clinic of the hospital for treatment of a major allergy. In spite of the fact that none of these was clinically sensitive to penicillin three gave positive skin tests to aqueous penicillin, two in the "non-allergic" group and one in the allergic group. On the other hand one of the clinically sensitive children mentioned above gave negative reactions (the other two could not be tested), and only three of the clinically sensitive adults gave positive reactions, the other four being negative.

Prevention of penicillin sensitivity reactions.—(1) Penicillin should be used only if there is a definite indication for its use, as in streptococcal infection or bacterial pneumonia, and should not be used indiscriminately for illnesses which cannot be expected to respond, such as diarrhœa or unexplained fever.

(2) Since penicillin is our best antibiotic it should not be used for minor infections which can be treated satisfactorily without chemotherapy or with other antibiotics.

(3) Penicillin should not be applied topically, especially to inflamed skin.

(4) Penicillin lozenges should be used rarely, if ever. Infections which respond to them are usually mild and can be treated by other means.

(5) Oral medication should be used when possible. Indications for parenteral penicillin are severe illness in which a prompt and high level of antibiotic is necessary, vomiting, and refusal of medication by mouth.

(6) Before the drug is administered by any route a history should be taken of previous administration and any reactions resulting from its use. If a reaction has occurred in the past, the indications for using the drug again must be carefully re-evaluated, or a much more serious reaction may result.

Diagnosis of penicillin sensitivity.—(1) History. A careful history is the main method of making a diagnosis of penicillin sensitivity. Questions concerning the administration of penicillin should be included in every medical history, especially those involving an unexplained skin rash or obscure illness.

*Kindly supplied by Messrs. Parke-Davis Co.

(2) Clinical observation. At the time of administration of penicillin the patient or parent should be warned to report any unexpected signs or symptoms. By observation at the time these occur the physician has the best opportunity to make a correct diagnosis of penicillin sensitivity.

(3) Skin tests. These are of insufficient value for routine clinical use.

Treatment of Penicillin Sensitivity Reactions

A. *Acute anaphylactic shock.*—(1) Epinephrine intramuscularly. At the first sign of an immediate reaction an adult should receive 0.5 to 1.0 c.c. of epinephrine in 1:1,000 dilution intramuscularly, followed in 2 or 3 minutes by a similar dose if no improvement is seen. (2) Aminophylline. As soon as the epinephrine has been administered, an adult should receive 3.75 grains of aminophylline in 10 c.c. fluid intravenously. (3) Oxygen. (4) Plasma. (5) Artificial respiration.

B. *Other sensitivity reactions.*—The treatment will depend on the particular type of reaction but the following medications must be considered. (1) Epinephrine subcutaneously. (2) Aminophylline orally or rectally. (3) Ephedrine orally. (4) Local applications to relieve itching. (5) Sedation. (6) ACTH intravenously or intramuscularly. (7) Cortisone orally or intramuscularly.

Summary and Conclusions

1. The literature on penicillin sensitivity has been briefly reviewed. The reported incidence of reactions varies from 2 to 10%. Most reactions are mild but 14 acute anaphylactic deaths have been reported.

2. Penicillin sensitivity is rare in children but more common in adults.

3. Skin tests with penicillin as a measure of penicillin sensitivity are unreliable for routine clinical use. A careful history and clinical observation are the means of making this diagnosis.

4. Methods of prevention, diagnosis and treatment of penicillin sensitivity reactions are summarized.

References

1. BROWN, E. A.: *Ann. Allergy*, 6: 723, 1948.
2 SMITH, W. S. AND WALKER, A. D.: Penicillin Decade (1941-1951) Arundel Press, Inc., Washington, D.C., 1952.
3. FEINBERG, S. M.: *Ann. Allergy*, 10: 260, 1952.

4. KEEFER, C. S., BLAKE, F. G., MARSHALL, E. K. JR., LOCKWOOD, J. S. AND WOOD, W. B. JR.: *J. A. M. A.*, 122: 1217, 1943.
5. LEPPER, M. H., DOWLING, H. F., ROBINSON, J. A. AND STONE, T. E.: *J. Clin. Investigation*, 28: 826, 1949.
6. WILENSKY, A. O.: *J. A. M. A.*, 131: 1384, 1946.
7. WALDBOTT, G. L.: *J. A. M. A.*, 139: 526, 1949.
8. HIGGINS, G. A. AND ROTHCHILD, T. P. E.: *New England J. Med.*, 247: 644, 1952.
9. CURPHEY, T. J.: Reported at the 1952 March Meeting of the American Academy of Forensic Sciences.
10. MAYER, P. S., MOSKO, M. M., SCHUTZ, P. J., OSTERMAN, F. A., STEEN, L. H. AND BAKER, L. A.: *J. A. M. A.*, 151: 351, 1953.
11. THOMSON, W. O.: *Brit. M. J.*, 70, 1952.
12. HARPMAN, J. A.: *Brit. M. J.*, 392, 1952.
13. SIEGAL, S., STEINHARDT, R. W. AND GERKER, R. G.: *J. Allergy*, 24: 1, 1953.
14. FEINBERG, S. M., FEINBERG, A. R. AND MORAN, C. F.: *J. A. M. A.*, 152: 114, 1953.
15. Editorial: *J. Allergy*, 23: 383, 1952.
16. GOLTMAN, J. S.: *Ann. Allergy*, 10: 278, 1952.
17. Reported at the 1953 Annual Meeting of the American Academy of Allergy.
18. FRIEDLAENDER, A. S. AND FRIEDLAENDER, S.: *Quart. Rev. Allergy*, 6: 54, 1952.
19. RISMAN, G. AND BOGER, W. P.: *J. Allergy*, 21: 425, 1950.

1421 Danforth Ave.

RÉSUMÉ

Selon différents auteurs, les réactions à la pénicilline se produiraient à la fréquence de 2 à 10%. Les manifestations mineures n'affectent que la peau. Bien que 14 cas de réactions anaphylactiques fatales aient été décrits dans les revues, plusieurs autres n'ont jamais été rapportés. Un contact antérieur peut provoquer la sensibilisation à l'antibiotique, quoique nombre de réactions se soient produites dès la première dose. L'application topique de pénicilline à une peau enflammée semble le plus sûr moyen de déclencher la sensibilisation. Les personnes manifestant déjà une allergie quelconque sont deux fois plus exposées à réagir à la pénicilline que les autres. Il existe de fortes réactions de co-sensibilisation entre les pénicillines G, BT et O. Les meilleurs critères dans le diagnostic de l'allergie à la pénicilline sont encore l'anamnèse et l'observation clinique, car les épreuves cutanées sont inconstantes et de peu de valeur en usage clinique courant. Les réactions allergiques sont plus fréquentes chez les adultes que chez les enfants. Les deux auteurs offrent quelques conseils pour prévenir les réactions de sensibilisation à la pénicilline et suggèrent une méthode de traitement des chocs anaphylactiques aigus et des autres réactions de sensibilisation.

M.R.D.

THE RESTORATION OF MAIN VESSEL PATENCY IN ARTERIOSCLEROSIS OBLITERANS*

JOSEPH C. LUKE, M.D., F.R.C.S.(Eng. & C.),
Montreal

METHODS OF IMPROVING the blood supply to an ischæmic lower extremity have shown great advances in the past ten years. New vasodilator drugs have appeared and the operation of lumbar sympathectomy in the selected case has gained wide acceptance. This operation has increased its field of usefulness recently by the recognition of the fact that the lumbar ganglia 1, 2, and 3 should be removed as a minimum. However all the above methods of therapy merely aim at improving collateral blood flow, with the areas of main vessel occlusion remaining as before. The symptoms of ischæmic neuritis, coldness and non-healing infections are improved by sympathectomy in the well selected case, but the common complaint of intermittent claudication is not often benefited by conservative treatment or sympathectomy. This fact is easily understood when it is realized that actively exercising muscle in a leg requires up to forty times more blood than the same muscles at rest. No improvement in collateral circulation, no matter how great, can produce this marked increase. This fact is particularly applicable when a major artery, such as the abdominal aorta or the iliac or common femoral artery, is occluded. Occasionally a segmental occlusion in the distal superficial femoral artery can be bypassed by the collateral circulation which increases in calibre (even without therapy) to the point where the distal circulation becomes adequate to support strenuous exercise.

In the past two years the increasing use of aortography and femoral arteriography has allowed the recognition of a large number of cases of arteriosclerosis obliterans where the occlusive process has remained segmental and confined to major arteries. This type of case lends itself to attempts designed to restore main vessel patency. The techniques of replacement of the occluded artery by an autogenous vein graft or by a homologous arterial graft and the operation of thromboendarterectomy (removal of the occluding thrombus and diseased intima) have all been used with success. It is the purpose of this presentation to discuss these methods and present nine cases where these procedures have been employed.

CLINICAL FEATURES

The clinical picture of segmental occlusion of a major artery is usually sufficiently indicative to suggest the diagnosis, but proper arteriographic visualization of the affected arterial tree is neces-

*From the Cardiovascular Service, Royal Victoria Hospital, Montreal.

sary for final confirmation. The young age of these patients is frequently surprising, with the condition manifesting itself in the early forties and fifties. As is usual in arteriosclerotic disease, the male sex preponderates but females are by no means immune.

The usual patient with segmental arterial occlusion will seek help because of intermittent claudication, and the level at which the claudication is felt will depend on the site of the occlusion. Blockage in the superficial femoral artery with a functioning profunda femoris artery will give the usual calf claudication after walking about one to two blocks at a moderate pace. When segmental occlusion is present in the external or common iliac artery the claudication pain is felt in the posterolateral thigh and buttock. When the lower aorta and/or both common iliac vessels are involved claudication takes the form of severe heaviness and semiparalysis of the legs and pain is felt in the thighs, buttocks and low back region.

Examination reveals practically no evidence of ischæmic trophic changes in the feet. Some general reduction in skin temperature is usually present but, on inspection, the affected limbs look normal. Palpation of the pedal pulses occasionally reveals a faint dorsalis pedis or posterior tibial pulsation but as a rule these cannot be felt. In the patient with superficial femoral segmental occlusion, the common femoral pulsation is normal and can, in a thin individual, be traced into the thigh to the upper limit of occlusion. In aortic or common iliac obstruction the common femoral pulse is absent or weakly positive. Oscillometric readings are uniformly reduced in the involved extremity and are usually 0.5 to 0.75 in the calf area. This reading is always higher than in the individual where the occlusive changes are more widespread in the limb.

Other evidence of generalized arteriosclerotic changes are commonly present as determined by the ophthalmoscope or electrocardiographic changes. X-ray survey of the major vessels often shows patchy calcification of the arterial wall.

It is obvious from the clinical examination that the limb is in no immediate danger from acute ischæmia as the collateral circulation has successfully bypassed the occluded segment. The process of the occlusion has been gradual and the collateral channels have had ample time to increase gradually in calibre. An acute blockage occurring at one of these levels would have been disastrous. Segmental occlusion can be likened to the closure of a short section of a main highway. The detours about this blocked area are sufficient to keep traffic moving when the volume is light but "jams" result at peak periods. The leg with such an arterial occlusion can get along well with light and intermittent exercise but gets into a "jam" when extra muscle activity is required. Such a leg has a marked slowing and decrease in blood flow in the distal patent arteries and, with these vessels also the seat of similar intimal degeneration to some degree, future thrombosis is more apt to occur than in a vessel with normal blood flow. Two patients have been admitted to hospital recently with late acute leg ischæmia requiring amputation, who had typical histories of unrecognized high level segmental occlusion for some years.

The annoying and disabling symptom of intermittent claudication and the possibility of future widespread arterial thrombosis justify the surgical attempt to re-establish patency in these major arteries.

METHODS

Restoration of normal flow in a case of segmental occlusion of a main vessel can be accomplished in two different ways. The operation of thromboendarterectomy (Fig. 1) consists in isolating the occluded segment between clamps, longitudinal incision of the vessel over the blocked area and removal of the organized thrombus and diseased intima. A good line of cleavage can be found between the intima and media to make this possible. The distal end of the cut should be sutured to the media to prevent an inward valve like folding of this cuff of intima. The vessel is repaired by suture of the incision, leaving a tube of adventitia and media and good pulsations will be found in the reconstituted vessel and distal branches. Experimental studies indicate that the repaired vessel will be re-endothelialized in ten to fourteen days. The new endothelium grows into the raw area from the cut distal and proximal ends of the intima and also from the mouths of branches and the numerous vasa vasorum.

The second method is the resection of the involved portion with reconstitution of the continuity by an autogenous vein graft or preserved homologous artery graft. The advantages of a vein graft are many. It is part of the individual's own tissue and not so susceptible to the degen-

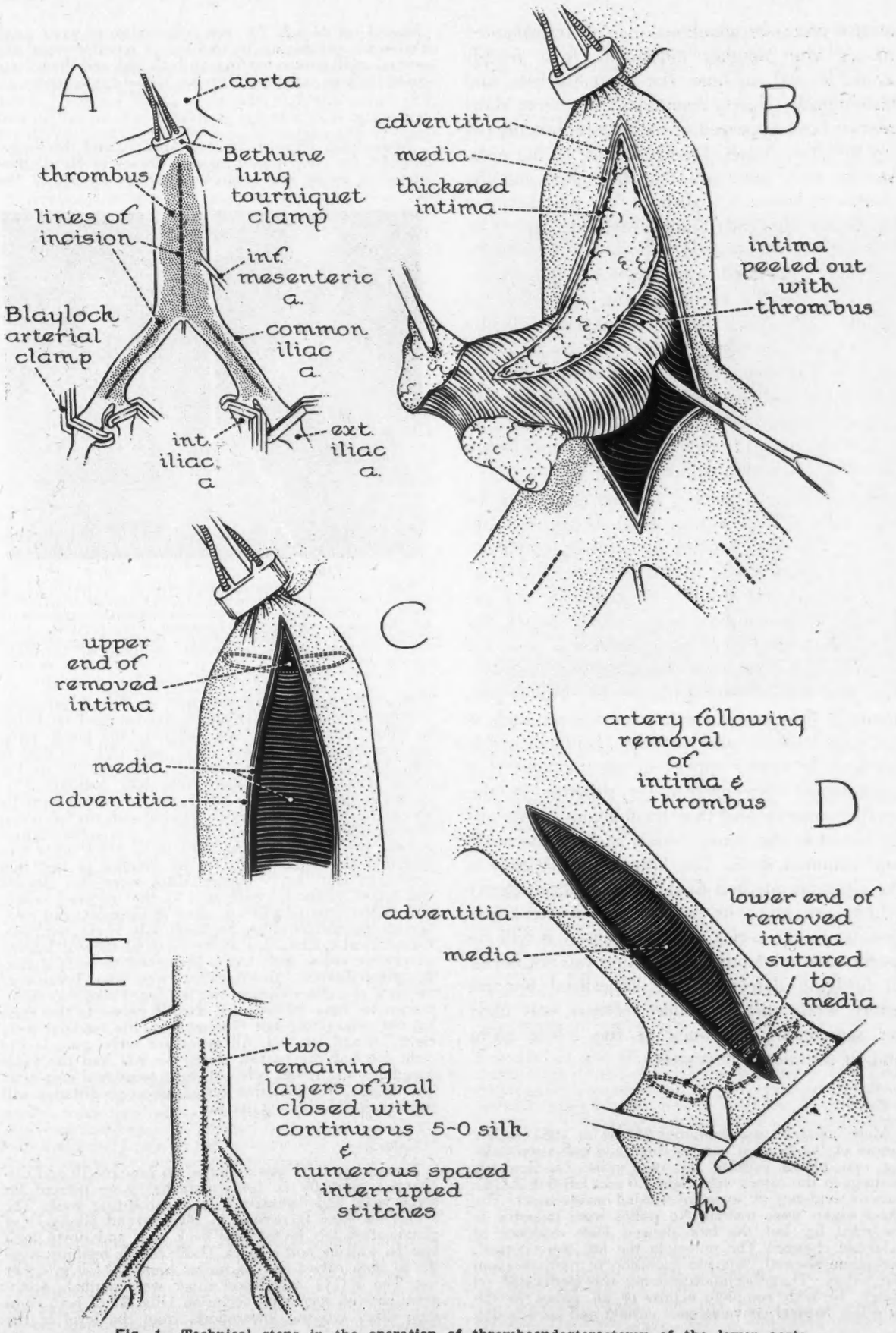


Fig. 1.—Technical steps in the operation of thromboendarterectomy of the lower aorta and common iliac arteries.

erative processes which occur in all transplanted tissues from another individual. It is readily available and, in time, the graft thickens and histologically closely resembles the artery. Many reports have appeared of such grafts functioning up to fifteen years. Disadvantages of the autogenous vein graft are that the graft initially dilates making for a disparity in size between the artery and graft lumina with consequent increased likelihood of thrombosis in the graft. To overcome this handicap, a graft initially smaller in lumen than the size of the artery to be bridged should be chosen. Large arteries such as the lower aorta and common iliacs are not as a rule suitable for vein grafting because of excessive ballooning and occasional rupture of the graft. A saphenous vein segment inserted into the superficial femoral artery is an ideal combination in respect to matching size of the lumina.

Homologous preserved arterial grafts can be used instead of an autogenous vein segment and this type of graft is being increasingly employed as more artery banks are coming into use. However the late results of such grafts are not yet known. Recent follow-up examinations of patients so treated over two years have revealed in some cases extensive degenerative changes in the graft with resulting thrombosis. This is particularly the case where smaller arteries such as the superficial femoral have been bridged by this method. It would appear at the moment that autogenous vein grafting is superior in the smaller arteries and that homologous grafts are indicated in the major vessels such as the aorta and common iliacs. The latter type of graft is the alternate method to thromboendarterectomy which also gives its best results in the larger vessels. In the series to be presented it will be seen that autogenous vein grafting was employed in bridging defects in the superficial femoral artery while thromboendarterectomy was used for segmental occlusions of the lower aorta and/or common iliac vessels.

CASE 1

Male, aged 59 was admitted March 8, 1953 with a history of claudication in right thigh and calf after walking two blocks existing for two years. Oscillometric readings in the calves were right 1.0 and left 5.0; E.C.G. showed evidence of some myocardial involvement. The blood sugars were normal. No pulses were palpable in the right leg but the foot showed little evidence of ischæmic changes. The pulses in the left were normal. Aortogram showed complete occlusion of right common iliac artery. Thromboendarterectomy was performed on March 10 with complete return of all pulses in the right leg. Normal convalescence ensued and he was discharged on March 20. No anticoagulants were used. Follow-up examination on October 16 revealed equal and normal oscillometric readings in both legs and the patient could walk an unlimited distance without symptoms.

CASE 2

Male, aged 46 was admitted April 22 and discharged May 10. He gave a nine months' history of claudication in calves, thighs and buttocks after two blocks. At this distance the legs became blanched, numb and heavy. No impotence was present. Examination revealed no pulses in either leg and none was felt over the lower aorta. Oscillometric readings were 0 in right calf and 0.25 in left. The glucose curve reached 252 mgm. % in 1½ hours. The blood cholesterol was 256. Aortogram revealed an occlusion of the distal aorta extending partially above the level of the renal arteries with the occlusion also involving both common iliacs. Thromboendarterectomy was performed on April 26 and the aorta was occluded above the renals for 25 minutes to free that section of clot. Both common iliacs were also cleaned out. Good pulsations were seen in the involved vessels and in the external iliacs at close of operation but postoperatively normal pulses returned only to the right leg. Pathological examination of the material showed hyaline connective tissue with calcification and thrombi undergoing calcification. Anticoagulants were used because of the lack of pulse return in the left leg. Follow-up examination on May 29 revealed normal pulses in the right leg but none in the left. The oscillometric readings were right 7.0 and left 0.3. All symptoms were gone in the right leg but the patient stated he still had the same symptoms on the left side but less intense and only after four blocks. We feel that his claudication distance will improve in the next six months.

Fig. 2

Fig. 3

Fig. 2. (Case 3).—Aortogram indicating occlusion of the aorta just distal to the renal arteries and also involving both common iliacs. The inferior mesenteric appears to be the major anastomotic channel. **Fig. 3.** (Case 3).—Postoperative aortogram revealing repair of the occluded aorta but continuing segmental occlusion of the right common iliac artery.

CASE 3

Female, aged 41 was admitted on January 19 and discharged February 5. Her complaints were present for three years and followed a long exhausting walk. The symptoms were increasing in severity and consisted of claudication felt in the low back area and down both legs on walking half a block. Oscillometric readings were 0.5 in both calves and no pulses could be felt in either leg. The E.C.G. and blood sugar were normal. Aortogram showed segmental occlusion (Fig. 2) of both common iliacs and the lower aorta from the level of the

renals down to the bifurcation. Thromboendarterectomy was performed on January 19 cleaning out the occluded arteries but technical difficulties were encountered in doing the right common iliac. All pulses returned to the left leg but not to the right, although the colour and temperature of the right foot was improved but not to the degree on the left side. No anticoagulants were used. The pathological report on the removed material was atherosclerosis with organizing thrombus. The patient was readmitted on May 10 and reported complete relief of symptoms in the left leg but continuance of the claudication in the right leg after a quarter of a mile. Repeat aortogram (Fig. 3) showed the aorta and left common iliac to be free of obstruction but segmental occlusion still existing in the right common iliac.

CASE 4

Male, aged 39 was admitted between September 27-October 10, 1951. His complaints at that time were intermittent claudication in the right calf for two months. This appeared after walking two to three blocks. Oscillometric readings were, right 0.2 and left 5.0. The right femoral pulse was normal but no pulsations could be felt below this level. Those in the left leg were normal. Femoral arteriogram showed a segmental occlusion of the upper two thirds of the right superficial femoral artery. A right lumbar sympathectomy was performed. This was before the possibilities of the arterial restorative procedures were appreciated. He was readmitted on August 17, 1953 with the story that his previous claudication had disappeared following the sympathectomy and that he had been well up to the day before when he suddenly developed pain in the entire right leg with blanching, coldness and decreased sensation in the right foot. Hypoæsthesia and all the signs of acute ischæmia were present in the right foot. The previously palpable right common femoral pulse had disappeared. Aortogram showed a normal lower aorta and left great vessels but a complete occlusion of the right common and external iliac vessels. One unidentified artery in the right upper thigh filled for a short distance and this seemed to justify removal of the occluded right iliac segments because of his acute ischæmia. At operation the common and external iliacs were found to be occluded by recent thrombus down to just proximal to the inguinal ligament. Thromboendarterectomy was carried out and the initiation of the thrombus was found to come from an area of marked intimal atherosclerosis at the origin of the right common iliac. Although the repaired segment pulsated well at the close of the operation no common femoral pulse returned in the postoperative period. However the foot improved in colour and temperature with relief of the ischæmic signs and symptoms. His convalescence was marred by the development of an incisional hernia and phlebothrombosis in the right calf.

Follow-up examination on October 14 revealed a warm pink right foot but his old symptom of calf claudication after two blocks has returned. The oscillometric readings in the calf are right 0.1, left 3.0.

CASE 5

Male, aged 54 was admitted April 27 and discharged on June 2. His complaints were multiple but those pertaining to his legs had been present unrecognized for over ten years despite several previous hospital admissions. He had dull aching pain in the posterolateral aspect of both thighs and in his buttocks on walking one to two blocks. Examination revealed a faint right femoral pulse but absence of all others in both legs. Aortogram (Fig. 4) revealed segmental occlusion of the lower two inches of the aorta and both common iliacs. Operation on May 7 confirmed these findings and thromboendarterectomy of the lower aorta and both common iliacs was done. At the close of operation excellent flow could be felt in the cleaned arteries but the left external iliac was not pulsating distal to the suture line. This was explored just beyond the terminal end of the suture line and the distal cut intimal cuff found to have folded inward occluding the vessel. This was trimmed and sutured to the media with resulting normal flow. Partial wound disruption occurred on the tenth day as the only complication. No anticoagulants were used. Follow-up examination on June 12 showed all vessels in the legs to be pulsating normally and his claudication symptoms to have completely disappeared. Repeat aortogram showed reconstitution of normal flow. The present oscillometric readings are, right 6.0, left 4.0.

Fig. 4 Fig. 5

Fig. 4. (Case 4).—Aortogram showing deformity and occlusion of the lower end of the aorta and closure of the left common iliac artery. The inferior mesenteric artery shows marked enlargement due to its collateral role. **Fig. 5.** (Case 6).—Femoral arteriogram indicating complete segmental occlusion of the upper two-thirds of the superficial femoral artery. The circulation is being maintained by the profunda femoris artery and its connections to the patent lower end of the superficial femoral.

CASE 6

Male, aged 52 was admitted August 30-September 12, 1953. He complained of claudication in the right calf muscles for the past three months. This followed walking two to three blocks. Examination revealed normal leg pulses on the left but no pulses below the common femoral on the right. Oscillometric readings in the calf were right 0.5, left 7.0. The A.C. blood sugar was 93 and the P.C. 165. The E.C.G. was normal. Femoral arteriogram revealed segmental occlusion of the mid third of the right superficial femoral artery (Fig. 5). Resection of this occluded area was carried out with substitution of the defect by a saphenous vein graft. Pathological examination of the resected specimen showed atherosclerosis with occlusion by thrombus formation. Postoperatively there was a complete return of all pulses in the right leg and follow up examination on October 10 showed the same findings with complete relief of symptoms. The oscillometric readings were right 6.0, left 7.0.

CASE 7

Male, aged 65. Admitted on August 27-September 11, 1953. His complaint was intermittent claudication in the right calf for 2½ years. Pulses were absent below the common femoral on the right but normal on the left. The blood sugar, E.C.G. and blood cholesterol

were within normal limits. Oscillometric readings were right calf 1.0, left 7.5. A femoral arteriogram revealed segmental occlusion of 13 inches of the right superficial femoral artery. On August 31 this area was resected and replaced with a saphenous vein graft. The pathological report was calcified atheromata with organized thrombus in the lumen. Following operation the foot improved in colour and temperature but only a weak dorsalis pedis pulse could be felt. This would indicate that a more distal level of blockage existed which was not detected preoperatively. Follow-up examination on September 22 revealed that his claudication symptoms had disappeared and that he could walk an unlimited distance. The oscillometric readings were right 1.5, left 7.0.

CASE 8

Male, aged 36 was admitted to the Montreal Neurological Hospital on May 31 and transferred to the Royal Victoria on June 12, 1951. His dossier is long but is of great interest in illustrating the extensive degree of involvement that can occur in a case of Buerger's disease. He gave a history of coronary thrombosis with hospitalization for 1 year in 1945. In 1946 he had paralysis of the left arm and right side of the face lasting 3 days. In 1948 he had sudden paralysis of the legs with pain and numbness and also again paralysis of the left arm and right side of the face. The signs and symptoms again lasted 3 days. In 1951 he was hospitalized for left-sided chest pain and shortness of breath with a diagnosis of coronary occlusion. His first admission to hospital in Montreal was in 1951 when three weeks prior to this he developed sudden blindness followed by homonymous hemianopsia and headache. There was a history of syphilis in 1930 and gonorrhœa in 1947. The neurological diagnosis was left homonymous hemianopsia due to encephalomalacia of the right parieto-occipital region due to arterial thrombosis. The spinal fluid Wassermann was negative, the Lange curve normal and the E.C.G. showed coronary insufficiency and was compatible with old anterior myocardial infarction.

On June 5, 1951 he developed, in hospital, acute pain, blanching and coldness of the right foot with bluish mottling on the lateral side of the sole. Anæsthesia of the big toe was present and no pulses could be felt below the common femoral. The pulses in the left leg were normal as were those in the arms. By June 12, despite conservative treatment, the big toe showed early gangrenous changes. Femoral arteriogram revealed an 8 inch segmental occlusion in the right superficial artery. The popliteal artery was visualized but both anterior and posterior tibial arteries were occluded just below their origins. Thromboendarterectomy of the occluded segment of superficial femoral artery was carried out on June 14 and the area was treated by regional heparinization according to the technique of Freeman for 3 days. No improvement in the distal pulses was expected but the foot became warm and pink and amputation of the big toe was done on June 20 with healing by first intention. Up to this time the patient had smoked 15 cigarettes per day.

He was readmitted on April 2, 1952 until April 16 with a history of a white, cold, painful left foot since March 27. He stated he had stopped smoking since the last admission. All pulses had disappeared in the left leg below the common femoral. The findings in the previously operated right leg were unchanged. The degree of ischæmia of the left foot was not severe and it responded to conservative therapy. A left femoral arteriogram showed occlusion of the left superficial femoral artery three inches above the knee with relatively good collateral circulation but no distal patent main vessels. The right leg had given no symptoms since discharge and the toe amputation was well healed.

The next admission was from September 12 to 30, 1953 when he gave a history of gradually increasing pain in the left leg and foot over the past 6 months with the development of a small painful ulcer on the dorsum of the left foot two weeks before admission. The left foot showed all the signs of severe chronic ischæmia and no pulsations were present in this leg. The common femoral pulse had disappeared. The right leg was as before. The B.W. and Kahn were negative, the blood sugars normal and the E.C.G. showed low voltage and myocardial changes. Aortogram revealed obstruction of the left common and external iliac vessels, also all distal main vessels. Only a few collateral channels were visible in the left thigh. The right leg showed no obstruction down to the superficial femoral artery where a segmental occlusion was seen corresponding to the area present in 1951. This would indicate that the operation performed at that time had failed in keeping that segment of artery patent. Left supracondylar amputation was performed on September 18. Sections taken from the arteries of the amputated leg showed the artery and vein to be involved in a fibrous process. The arteries were completely occluded by organized thrombus, the veins were patent. The pathological picture was compatible with a diagnosis of thromboangiitis obliterans. The wound healed perfectly. The patient insists he has not smoked since 1951 but his disease is obviously gradually extending and it is likely that further episodes of arterial occlusion will take place.

CASE 9

Male, aged 47 was admitted on October 22, 1953 complaining of intermittent claudication in feet and calves for the past seven years. The symptomatology had gradually accentuated to the point where he could walk only one block. On admission his E.C.G. was normal but the blood sugars were A.C. 116, P.C. 204. The oscillometric readings in the calf were right 1.0, left 0.4. A rise of approximately 6° C. occurred in the left foot following lumbar block. Aortogram revealed segmental occlusion of 32 cm. of the left superficial femoral artery and multiple areas of partial occlusion in the right superficial femoral and right common iliac arteries. A large arteriosclerotic plaque was visualized in the lower aorta occluding the lumen about 50%.

Due to the diffuse nature of the disease, it was thought that removal of the aortic plaque would give the best increase in limb circulation and this was done on October 31. The aorta was explored and a thromboendarterectomy carried out over the lower two inches. The repaired aorta and common iliac arteries were seen to pulsate well at the close of the operation. However when the drapes were removed, both legs appeared blanched, cold and cadaveric. The patient was observed for the next three hours when both legs to the groin became blue, mottled and colder. It was obvious that very little circulation existed in either leg. Either thrombosis had occurred in the arteries distal to the aorta or the lower cut end of the intima had formed a valve-like fold completely occluding both common iliacs. The incision was reopened four hours later and the repaired aorta found to be pulsating normally but pulses in each common iliac were absent. The common iliacs were explored; the lower cut end of the intima (despite the anchoring sutures inserted at the time of the first operation) had dissected downward and folded inward producing complete obstruction. The obstructing mass was removed and the intima reanchored. Normal pulsations resulted in the left external iliac artery but not on the right. The right common iliac was re-opened and several distal clots removed but the pulsations on the right still remained poorer than the left. Following operation the lividity of the left leg disappeared but was still present in the right foot. The pathologist reported that the material removed showed marked intimal sclerosis.

The patient's general condition responded rapidly and both legs improved, completely on the left but only to the foot on the right. Loss of sensory and motor power of both legs resulted and the calf muscles felt tense and boggy indicating ischæmic muscle changes. The length of almost total occlusion of blood supply to the legs was nine and one-half hours from the time of application of the aortic clamp at the first operation to return of blood flow following the second operation. Bladder paralysis has occurred, and, at the moment of writing, the calf muscles of both legs have softened, mild postoperative

œdema of the legs is subsiding, sensation is returning to the legs which is protopathic in type but no muscle power is evident. Both legs and feet are well vascularized with the exception of the toes of the right foot which are showing early gangrenous changes. The eventual prognosis in respect to use of his legs is as yet unknown.

DISCUSSION

The first reports of surgical restoration of main vessel flow in segmental arteriosclerotic occlusion appeared in the European literature.[1, 2, 3] As in any new procedure, it would appear that the indications for operation in many of their cases were not as rigid as those now accepted, and the results therefore not as good as achieved in later reports. A successful outcome following the use of autogenous vein grafts was commoner than after thromboendarterectomy until the technique of longitudinal incision of the involved artery segment was described by Reboul.[3] This latter technique is the one outlined and is now the universal method in this type of operation. In North America, Barker and Cannon,[4] Wylie,[5] Julian[6, 7] and others have reported series of cases employing autogenous vein grafting, homologous arterial grafting and thromboendartectomy. Julian describes eighteen cases where autogenous vein grafts were used in the femoral artery with six failures due to thrombosis of the graft and 12 successes. One of the six patients died and two required amputation. Wylie reports 38 cases of aortic, iliac and femoral thromboendarterectomies in 25 of which circulation was completely restored, four improved, two unchanged, three required amputations and four died.

In the present series, three cases (1, 5, 6) showed a complete restoration of circulation, and two (2, 5) had complete restoration in one leg but only partial in the other. Case 4 was not ideal but operation was done to avert gangrene of the foot. Return of pulses was not expected in this case but the result would appear to justify the effort. Case 6 did not show a complete return of distal pulses but did have sufficient improvement in circulation to relieve all symptoms. Case 8 is included chiefly to give the story of a remarkable case of Buerger's disease.

Case 9 is a most unfortunate result and many lessons can be learned from this. First of all this patient had only a partial occlusion of his lower aorta and consequently his collateral circulation was not increased to the degree that occurs in complete occlusion. His legs were therefore almost totally ischæmic as a result of the intimal obstruction which occurred. One wonders therefore if this type of surgery is justified in the presence of partial obstruction, because of the severe effects if things go wrong and main vessel circulation is not restored. This case also illustrates the difficulty in anchoring the distal cut end of intima and emphasizes the one technical drawback of this procedure. As a result of this case, and of cases 2 and 3 in which only partial restoration of circulation occurred in one of the legs, efforts are being directed to remedy this point.

The published results to date are sufficiently encouraging to indicate that this method of approach is a worthwhile addition to the surgery of arteriosclerotic obliterans. The spectacular successes will follow in those individuals where the indications for surgery are rigidly followed, namely where the angiogram reveals a segmental obstruction of one of the major vessels with patent arteries distal to the area of occlusion. The angiogram must be a complete one from the lower aorta to the bifurcation of the popliteal because multiple areas of partial or complete segmental occlusion may be uncovered. The best results will be achieved in the younger individuals below fifty-five years, because in the older age groups the disease becomes more diffuse. A comforting aspect of this variety of surgical effort is the fact that if thrombosis of the repaired artery or the graft should unfortunately occur in the patient with complete segmental occlusion the patient's circulation is not made worse. The collateral circulation about the occlusion is already well developed and so can continue as before. The surgeon should take great care not to sacrifice any functional collateral vessels at time of operation.

It would appear that the only point where difficulty occurs both in thromboendarterectomy and homologous arterial grafting of major vessels is the distal cut end of the intima in the former operation and the distal suture line in the latter.[7] The cut end of the intima tends to dissect off the media and fold inwards producing obstruction. This presumably occurred in cases 2 and 3 and definitely in case 9. Suturing this sclerotic intima to the underlying media is not easy and it is likely that some of these sutures cut out because of the force of the on-rushing blood. When this point can be resolved, these operations should result in a greater percentage of complete restoration of distal blood flow.

The question of whether or not anticoagulant drugs should be used postoperatively is an important one. Ideally they should, but accidents from the use of these drugs still continue and leakage from a suture line can be fatal especially if intra-abdominal. Occlusion of a graft by pressure of a surrounding hæmatoma can also nullify an otherwise good result. It is the author's opinion that anticoagulants should be used when the procedure has been done on smaller vessels such as the superficial femoral artery because the small calibre of such an artery makes for more thrombotic possibilities. Operation on major vessels such as the aorta and iliac vessels does not need anticoagulants because of their greater diameter and high velocity of flow.

SUMMARY

1. A description and discussion of the relatively new procedures of thromboendarterectomy, autogenous vein graft and homologous arterial graft bridging of segmental arterial occlusion due to arteriosclerosis obliterans is presented.

2. The symptomatology in these cases is almost entirely that of intermittent claudication, the level and severity of the claudication depending on the level and extent of the occlusion.

3. The selection of cases for these operations should be most carefully done and femoral arteriography or aortography is essential to this selection. Patients below fifty-five obtain better results because the disease process tends to be major in only one area of the arterial tree. A diffuse arterial involvement contraindicates this type of surgery.

4. Nine cases are discussed where vein grafting of a segmental occlusion was carried out in the superficial femoral artery or where thromboendarterectomy was performed on the lower aorta and/or common iliac arteries.

REFERENCES

1. BAZY, L. J.: *J. de Chir.*, **65**: 196, 1949.
2. FONTAINE, R. P., BUCH, R., RIVEAUX, M. AND HUBINOT, J.: *Lyon Chir.*, **46**: 73, 1951.
3. REBOUL, H. AND HIGUIER, J.: *Mém. Acad. de Chir.*, **75**: 318, 1949.
4. BARKER, W. F. AND CANNON, J. A.: *Arch. Surg.*, **66**: 488, 1953.
5. WYLIE, E. J.: *Surgery*, **32**: 275, 1952.
6. JULIAN, O. C., DYE, W. S., OLIVIN, J. H. AND JORDON, P. H.: *Ann. Surg.*, **136**: 459, 1952.
7. JULIAN, O. C., GROVE, W. J., DYE, W. S., OLIVIN, J. H. AND SADOVE, M. S.: *Ann. Surg.*, **138**: 387, 1953.

PERNICIOUS ANÆMIA II: MAINTENANCE TREATMENT WITH CRYSTALLINE VITAMIN B_{12}*

DOUGLAS G. CAMERON, M.D., S. R. TOWNSEND, M.D. and A. ENGLISH, M.D., *Montreal*

SOON AFTER the discovery of vitamin B_{12} it became clear that this agent will evoke an initial remission in patients with pernicious anæmia. The remission is comparable in every way to the response produced by potent liver extracts.[1] The effectiveness of vitamin B_{12} for maintenance treatment in this disease remained to be demonstrated. At the present time most investigators agree that the crystalline vitamin has proved at least as effective as potent liver extracts during the three to four years since it became available for general use.[2 to 6] There is still a diversity of opinion concerning the optimum dose and the length of intervals between injections. Early in 1950, as a prelude to the present study, we reviewed the effects of maintenance treatment using potent liver extracts in 63 cases of pernicious anæmia.[7] Most of the patients had been under observation for 10 to 20 years. The results were gratifying. During the past 3½ years we have used crystalline vitamin B_{12} for maintenance treatment in 28 cases of pernicious anæmia, 30 μg. doses being given by intramuscular injection at weekly intervals. The results were entirely satisfactory and similar to our experience using comparable doses of potent liver extracts.

CLINICAL MATERIAL AND METHODS

Fifty patients with pernicious anæmia volunteered for this study. There were 32 women and 18 men in this group and their ages ranged from 44 to 83. All of them had responded promptly to initial treatment and were in a state

*From the McGill University Clinic of The Montreal General Hospital.
Presented at the annual meeting of The Royal College of Physicians and Surgeons of Canada, Montreal, October 30, 1953.
This work was done with the aid of a grant from Messrs. Armour & Co. Ltd.

of satisfactory remission at the start of the study. Forty-eight had been receiving 30 U.S.P. units of concentrated liver extract weekly by the intramuscular route. Vitamin B_{12} in doses of 30 μg. weekly was substituted for the further maintenance of 26 selected at random from this group. The same dose of vitamin B_{12} was prescribed for 2 cases which had been treated solely with this agent. The remaining 22 patients served as controls and continued to receive their usual doses of liver extract.

The duration of the follow-up period is shown in Table I; 45 patients were followed up for 3½ years, 2 for 2 to 3 years and 3 for 1½ years.

TABLE I.

DURATION OF FOLLOW-UP
50 CASES OF PERNICIOUS ANÆMIA

No. of cases		
B_{12}	*Liver extract*	*Years*
25	20	3–4
1	1	2–3
2	1	1–2

A complete physical and hæmatologic examination of each patient was made at the start of the study. The blood counts were checked at 6 month intervals. A final blood count and physical examination of each patient was made to complete the study.

RESULTS

Subjective.—None of the patients had symptoms of anæmia at the start of the study; 16 had mild paræsthesiæ. At the conclusion of the study none had symptoms of anæmia. Paræsthesiæ persisted unchanged in 16. They did not develop other neurologic complaints. The rest had no neurologic symptoms.

Objective.—The final red cell count was higher than 4 million per c.mm. and the hæmoglobin level was above 12.5 gm. per 100 ml. in every case. Fourteen patients had reflex changes, sensory disorder or faulty co-ordination at the start of the study. These abnormal findings persisted, but there was no progression of the neurologic disease. Moreover, none of the patients free of neurologic disease at the outset developed this complication during the study period.

DISCUSSION

Vitamin B_{12} is being used widely for the maintenance treatment of pernicious anæmia. Already several reports have indicated the value of this agent in maintaining normal levels of hæmoglobin and arresting the neurologic complications of the disease. Conley and his colleagues at the Johns Hopkins Hospital treated 54 patients with vitamin B_{12} for periods of 21 to 40 months.[2] Maintenance doses of 45 μg. intramuscularly were given every 6 weeks to most of these patients. However, the data suggest that this dose was too small. Blackburn and his associates in Sheffield used vitamin B_{12} for the treatment of 22 cases for 2 years.[3] Previously, these patients had been maintained satisfactorily with concentrated liver extract. 30 μg. of vitamin B_{12} every 2 weeks was prescribed for most of them. The results indicated that hæmoglobin levels remained satisfactory for 18 months but tended to fall during the last 6 months of the study. Walker and Hunter of Dundee studied the effect of huge single doses of vitamin B_{12}.[4] A dose of 1,000 μg. given intramuscularly to untreated patients produced hæmatologic remissions lasting from 4 to 12 months. However, in some cases evidence of bone marrow reversion could be detected in less than 2 months and one patient suffered a neurologic relapse in 6 weeks. In Boston, Murphy and Howard gave 1 μg. doses of vitamin B_{12} daily by the intramuscular route to 8 patients for 21 to 39 months.[5] This regimen was found to be completely effective.

From this accumulated experience two points seem clear. Tiny doses (1 μg.) given daily by the intramuscular route are fully effective for maintenance treatment, but this regimen is not practical for general use. Huge single doses (1,000 μg.) cannot be relied upon to give effective control for periods longer than 4 to 6 weeks. It remains to determine the smallest dose given at the longest intervals which is fully effective for maintenance treatment. Forty-five μg. at 6 weeks' intervals did not prove adequate for many of Conley's patients. Indeed, nearly one-fifth of them had hæmoglobin levels less than 12.5 gm. per 100 ml. after 20 months of treatment. The 50 μg. doses given at 2 week intervals by Blackburn were effective for 18 months but hæmoglobin levels tended to drop after that time. Nonetheless these clinical studies have indicated within broad limits the requirements of vitamin B_{12} for adequate maintenance.

Direct measurement of serum and urine vitamin B_{12} levels promises to define these requirements much more accurately. Mollin and

Ross in London have used a microbiological assay technique to determine the serum concentration of vitamin B_{12} in normal individuals and in patients with pernicious anæmia.[8] They showed that the lowest level in normals is about 100 $\mu\mu$g. per ml. In contrast, patients with untreated pernicious anæmia invariably had serum concentrations far below this level. Furthermore, they were able to demonstrate a close correlation between falling serum vitamin B_{12} levels and a relapse of the disease.[9] When serum levels dropped below 100 $\mu\mu$g. per ml. early megaloblastic change could be detected in the bone marrow within a few days. They studied the periods of time that serum levels remain above the critical level of 100 $\mu\mu$g. per ml. following single injections of vitamin B_{12}. In some cases the serum concentration fell below the critical level within a week after single injections of 20 or 40 μg., and as early as 11 days following doses of 80 or 160 μg. When 320 μg. doses were given the first drop below the critical serum level occurred after 39 days. Increasing the dose to 1,000 μg. did not prolong this interval. These findings suggest that even large doses of vitamin B_{12} will prove insufficient in some cases if the interval between injections is greater than 2 weeks. Indeed, a critical analysis of the published clinical results indicates that this is so.

TABLE II.

Patient	Age and sex	Blood values at end of B12 study			
		Hæmatocrit	R.B.C. in millions	Hæmoglobin in grams per 100 ml.	M.C.V. in cu. microns
1. V.C.	70 M	49	5.0	15.6	98
2. G.M.	65 M	48	4.8	14.9	100
3. H.G.	61 M	41	4.2	12.7	97
4. J.M.	75 M	51	5.8	15.6	100
5. W.A.	83 M	46	4.7	14.3	100
6. B.R.	60 F	42	4.7	13.4	89
7. W.M.	64 F	44	4.5	13.7	100
8. A.P.	70 F	49	5.1	14.9	98
9. P.M.	57 F	44	4.5	14.0	97
10. A.B.	63 F	46	4.7	14.6	97
11. S.T.	67 F	43	4.3	13.1	100
12. R.M.	69 F	42	4.2	13.1	100
13. E.S.	57 M	52	5.6	16.8	93
14. M.G.	55 F	42	4.6	13.1	91
15. R.C.	51 F	49	5.1	14.3	96
16. W.E.	64 F	43	4.7	14.3	93
17. R.K.	56 M	49	5.1	15.2	98
18. G.E.	70 F	45	4.9	14.6	93
19. W.S.	54 F	42	4.4	13.1	97
20. C.J.	44 F	43	4.3	13.2	100
21. M.W.	65 F	46	4.8	14.9	95
22. A.P.	76 M	45	4.5	13.7	100
23. J.G.	73 F	41	4.3	12.7	95
24. D.W.	44 F	44	4.5	13.4	97
25. J.F.	64 F	41	4.2	13.1	97
26. W.C.	76 F	42	4.2	13.1	100
27. J.M.	73 F	42	4.4	13.7	95
28. J.F.	49 M	45	4.6	14.0	100

A variety of treatment schedules has been advocated. Most of these have proved inadequate for proper maintenance in a considerable proportion of patients. Clearly the doses are too small or the intervals between injections are too long. The optimum regimen remains to be determined. Thirty μg. doses at weekly intervals maintained all our 28 patients in good health. This regimen was completely effective and seems reasonable in the light of present knowledge.

SUMMARY AND CONCLUSIONS

Crystalline vitamin B_{12} was used for the maintenance treatment of 28 patients with pernicious anæmia. 25 were followed for 3 to 4 years, 1 for 2 to 3 years and 2 for 1 to 2 years. 30 μg. doses were given at weekly intervals by the intramuscular route. During this time 22 additional patients were maintained on weekly doses of 30 U.S.P. units of concentrated liver extract. This treatment was completely effective in both groups. Red cell counts were maintained above 4 million per c.mm. and hæmoglobin levels above 12.5 gm. per 100 ml. in all the patients. There was no progression of neurologic symptoms. Moreover, no patients free of this complication at the outset developed neurologic symptoms during this study.

The optimum regimen using vitamin B_{12} for maintenance treatment in pernicious anæmia remains to be determined. Most schedules have proved inadequate in a considerable proportion of patients. Thirty μg. doses at weekly intervals maintained all our 28 patients in good health. This intensive treatment was effective and seems reasonable in the light of present knowledge and experience.

REFERENCES

1. WEST, R.: *Science*, **107**: 398, 1948.
2. CONLEY, C. L., GREEN, T. W., HARTMANN, R. C. AND KREVANS, J. R.: *Am. J. Med.*, **8**: 284, 1952.
3. BLACKBURN, E. K., BURKE, J., ROSEMAN, C. AND WAYNE, E. J.: *Brit. M. J.*, **2**: 245, 1952.
4. WALKER, W. AND HUNTER, R. B.: *Brit. M. J.*; **2**: 593, 1952.
5. MURPHY, W. P. AND HOWARD, I.: *New England J. Med.*, **247**. 838, 1952.
6. BREWERTON, D. A. AND ASHER, R. A. J.: *Lancet*, **2**: 265, 1952.
7. CAMERON, D. G., TOWNSEND, S. R. AND MILLS, E. S.: *Canad. M. A. J.*, **65**: 241, 1951.
8. MOLLIN, D. L. AND ROSS, G. I. M.: *J. Clin. Path.*, **5**: 129, 1952.
9. *Idem*: *Brit. M. J.*, **2**: 640, 1953.

ERRATA

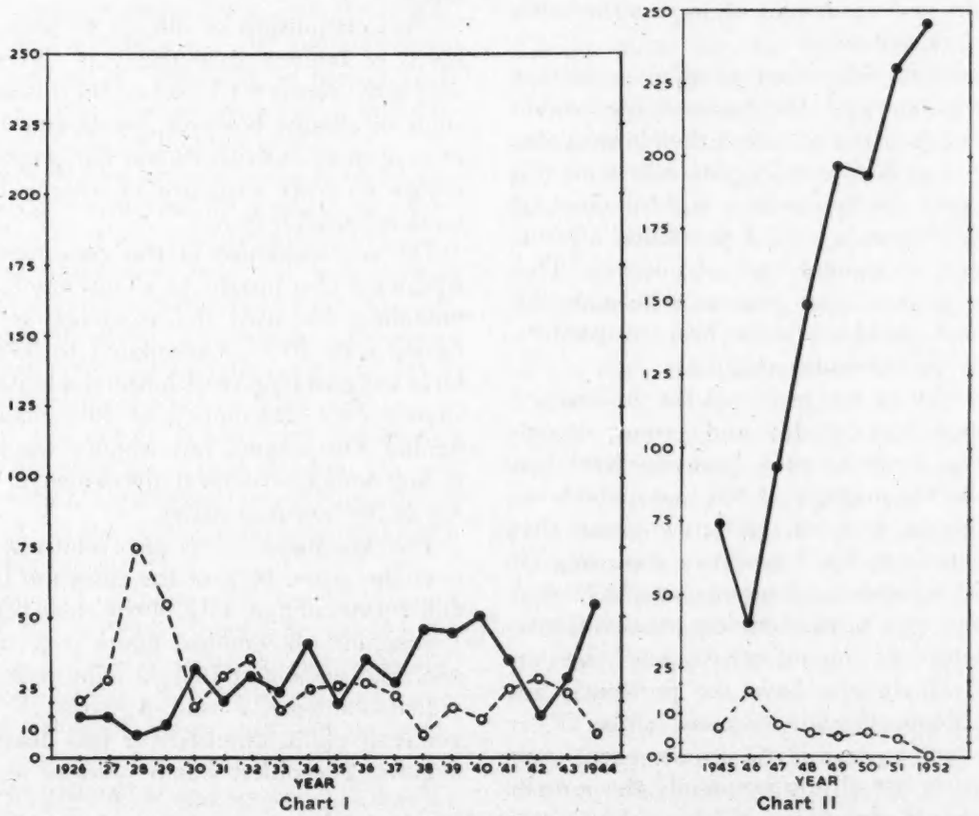
On page 190, February 1954, column 2 the words "valueless veins" should read "valveless veins"; and in the case report lower down "adrenocarcinoma" should read "adenocarcinoma".

PRESENT-DAY ASPECTS OF ACUTE LARYNGOTRACHEITIS*

J. A. TURNER, M.D., *Toronto*

ACUTE LARYNGOTRACHEITIS, a clinical condition occurring almost exclusively in childhood, may be defined as an inflammation of the larynx and trachea with consequent œdema resulting in a variable degree of obstruction to the airway. In referring to the symptom-complex thus produced many different terms have been applied. The older terminology used the word "croup" which today is more usually applied to "nocturnal croup" occurring typically at night, consisting of a harsh, barking cough and a husky voice with little or no evidence of respiratory obstruction. The term laryngotracheobronchitis which is still used fairly frequently is a somewhat cumbersome term, as is the less common term pharyngo-laryngo-tracheo-bronchitis. We are seeing fewer cases today with evidence of bronchial involvement and therefore tend to group all these cases which exhibit signs of respiratory obstruction under the heading of laryngotracheitis. This term may be further shortened and is familiarly dubbed "tracheitis".

This disease has been receiving increasing attention in the past decade or so, as attested by the increasing number of articles written on the subject, not only from this continent, but also from the British Isles, the Scandinavian countries, South America, Africa, Germany, and even Russia. In the Hospital for Sick Children we are seeing an increasing number of patients each year, suffering from the disease. In 1947 Morgan and Wishart[1] published a paper on this subject, which article is widely quoted, and in it published Chart I including cases admitted up to 1944. Chart II shows the figures for admissions to the Hospital for Sick Children diagnosed as acute laryngotracheitis from 1945 to October 1952.



Continuous Line represents hospital admissions. Dotted Line represents mortality percentage.

Why are we seeing more cases? There are several possible explanations. (1) There is an increased awareness of the disease among practitioners dealing with children. (2) With the knowledge of the complications which may arise, there is an increasing tendency to hospitalize even mild cases. (3) This community, in keeping with

*From the Hospital for Sick Children and the Department of Pædiatrics, University of Toronto, Toronto, Canada.

other large cities, has undergone a great expansion in population in recent years and there is consequently a greater number of patients from which to draw. (4) Is there a true increase in the incidence of the disease? This is a question which is difficult to answer without a detailed statistical analysis. It would seem unlikely that the increasing number of cases which we are seeing is due entirely to the first three factors.

ETIOLOGY

Without doubt we must postulate that the exciting cause of laryngotracheitis is infection. The peak incidence of the disease occurs in the winter months when bacterial infections are at their height and epidemics of laryngotracheitis have been described.[2, 3, 4]

It is probable that many of these infections are primarily bacterial. The organism responsible for the most dramatic picture is the *Hæmophilus influenzæ* type B. Clinically, infection with this organism typically produces a sudden onset of respiratory distress in a child previously exhibiting no signs or minimal signs of infection. This respiratory distress may progress with alarming rapidity and sudden death from respiratory failure is a very definite possibility.

Contrasted with this picture is the gradual onset of respiratory stridor and croupy cough complicating a simple cold. Between these two extremes lie the majority of the cases which we see in hospital. It is in this latter group that bacteriological studies may prove confusing. It is doubtful whether cultures of nasopharyngeal secretions or even of tracheal secretions will give a true picture of the infecting agent, even in those individuals who have not previously received antibiotic therapy. A pure culture of an organism such as hæmolytic streptococcus may be significant, but all too frequently the growth is a mixture of organisms, which renders interpretation difficult.

The role of a virus in the etiology of laryngotracheitis is uncertain. Beach[5] at Princeton and later Burnet and Foley[6] in Australia have demonstrated a specific virus in acute laryngotracheitis of fowls, but as yet no such agent has been identified in the human disease. Viral etiology may be suspected in those cases with a low or normal leukocyte count. At the present time an investigative program is underway here in an attempt to isolate a virus from cases admitted to hospital.

The question of predisposing causes in laryngotracheitis presents a fertile field for speculation. The large majority of cases which we see in this centre are from urban districts. Only 6% are from areas outside greater Toronto. The obvious explanation of this is that we mainly draw our cases from this metropolitan area. One wonders, however, whether industrial smog may play a part. Also we are in an area where central heating is the rule. The dry atmosphere resulting from such a heating system may tend to the development of the disease. Sudden changes in temperature are followed by a rush of admissions to our tracheitis unit. This phenomenon may be related in some way to the heating systems in the home.

The relationship of allergy to laryngotracheitis is of interest particularly in those children who have recurrent bouts of the disease. Other signs of allergy, however, are largely lacking in most of these individuals and the family histories reveal no more evidence of allergy than in a random hospital group.

The sex incidence in this condition presents somewhat of a puzzle. In almost any large series including our own the incidence is predominantly male 65% as compared to 35% female. Over the past four years hospital admissions have shown a sex distribution of 56% male to 44% female. One cannot but wonder whether there is any minor structural difference at an early age in the larynx of males.

The age incidence is also relatively constant over the years; 60% of the cases are between 1 and 3 years of age, 15% of the cases occur under 1 year and an identical figure over 5 years of age. The remaining 10% of admissions are individuals between 3 and 5 years of age. The youngest child admitted for this disease was 3 months. The oldest was 8 years of age.

DIFFERENTIAL DIAGNOSIS

1. *Foreign body.*—(a) Tracheal—the symptoms may be identical. Cough, stridor, respiratory obstruction, may all be present. The most important point in the differential diagnosis lies in the history of choking on food or on an object. Physical examination and fluoroscopy may reveal lateralizing signs indicative of foreign body aspiration.

(b) Œsophageal.—This is a not uncommon cause of respiratory obstruction. We recently admitted one fatal case in which the true condi-

tion was unrecognized until autopsy, when a coiled wire was discovered in the œsophagus. During the period of observation before death this infant revealed no signs of œsophageal obstruction whatsoever.

2. *Diphtheria.*—In this locality diphtheria is a fortunate rarity but the possibility should always be kept in mind and the history of immunization procedures should be obtained.

3. *Asthma.*—It seems strange perhaps that asthma and laryngotracheitis can be confused, since the respiratory obstruction in the former is mainly in the expiratory phase while that in the latter is inspiratory in timing. In severe cases of laryngotracheitis, there may be both inspiratory and expiratory stridor. The use of 3-4 min. of adrenalin as a therapeutic trial may be helpful in differentiation. The possibility of foreign body aspiration in this type of respiratory difficulty should also be seriously entertained.

4. *Bronchiolitis.*—This condition is characterized by low down respiratory obstruction occurring usually in the younger infant. Physical examination reveals a baby in considerable distress with both inspiratory and expiratory obstruction to breathing. Numerous widespread fine râles are noted throughout both lung fields.

5. *Retropharyngeal abscess.*—This condition as a cause of respiratory stridor and obstruction should not be forgotten. These children are usually toxic with a high temperature. Palpation of a boggy mass in the posterior pharynx will make the diagnosis certain.

In this regard I might stress the fact that examination of the pharynx should be undertaken with caution in cases of severe laryngotracheitis. Too vigorous attempts to see the epiglottis may precipitate laryngeal spasm with distressing results.

Diagnostic criteria in the assessment of acute laryngotracheitis depend on 4 main features.

(1) Pulse rate. The initial pulse rate may be misleading because of apprehension. The pulse rate under sedation is more important. An increase in pulse rate under these conditions is a danger signal. (2) Respiratory rate. This too, is influenced by initial apprehension and usually varies as does the pulse rate. (3) Restlessness. This is probably the most important single prognostic sign in the assessment of the case. Increasing restlessness despite adequate medical therapy is of grave import. One should not wait until a child with increasing restlessness has reached the point of fatigue. Operative intervention in such a case offers a high mortality. (4) Degree of air entry into the lungs is of value in determining the severity of respiratory obstruction. Along with this the degree of indrawing of the soft parts of the thorax and neck is of assistance.

TREATMENT

There are three essentials in the treatment of acute laryngotracheitis. These are:

1. Moist air—best supplied as cool, moist oxygen, as found in the Croupette.* Moisture achieves liquefaction of the secretions in the respiratory tract, and for this reason adequate hydration of the child is also of supreme importance.

2. Sedation—the use of a sedative is most valuable in reducing the apprehension and fear which the child exhibits, and allows for more restful and more efficient respiration. Seconal® gr. ¾ per rectum for all ages except the young infant is usually sufficient. It is important not to give sedatives in large doses for fear of masking the signs of progress of the disease according to the criteria previously mentioned.

3. Antibiotics—many combinations of antibiotics have been recommended. Routinely the drugs of choice are streptomycin and penicillin. Streptomycin may be discontinued after 24 hours except in those patients who are severely ill or in whom *Hæmophilus B influenzæ* bacillus has been demonstrated. Penicillin in repository form may be continued until the child is clinically well. We have largely discarded aureomycin in routine treatment because of the difficulty in administration of this drug to the apprehensive young child.

4. Tracheotomy.—The indications for tracheotomy vary with each individual case but as a rule any child who fails to show a satisfactory response to medical management, according to the criteria mentioned, after a maximum observation period of 2 hours, should be tracheotomized.

5. No discussion of treatment would be complete without mentioning the most important factor of nursing care. The constant observation and reassurance provided by a competent nurse familiar with the danger signals in this condition is of inestimable value in the treatment of laryngotracheitis.

Prognosis.—The overall prognosis is good. Our mortality rate is relatively low (Chart II), but

*Manufactured by Air Shields Inc., Hatboro, Pa.

Canad. M. A. J.
April 1954, vol. 70

a mortality rate, however low, still presents a challenge. In an effort to reduce these figures to zero, attempts to further earlier diagnosis, better methods of treatment and investigations as to etiology must be continued and are continuing.

REFERENCES

1. MORGAN, E. A. AND WISHART, D. E. S.: *Canad. M. A. J.*, **56**: 8, 1947.
2. EVERHART, M. W.: *Texas State J. Med.*, **43**: 776, 1948.
3. JEFFREY, F. W.: *Canad. M. A. J.* **53**: 562, 1945.
4. FORFAR, J. O., KEAY, K. R. AND THOMSON, J.: *Lancet*, **1**: 181, 1951.
5. BEACH, J. R.: *J. Exper. Med.*, **54**: 809, 1931.
6. BURNET, F. M. AND FOLEY, M.: *Australian J. Exper. Biol. & Med. Sc.*, **19**: 235, 1941.

ANTICOAGULANT THERAPY OF RECENT CARDIAC INFARCTION*

C. R. BURTON, M.D., M.R.C.P., F.R.C.P.[C],†
Toronto

THE RATIONALE of the use of anticoagulants in the treatment of cardiac infarction stems from several lines of evidence. The frequent occurrence of mural thrombi and subsequent severe and often fatal embolism have been reported by a number of authors.[1 to 19] The recurrence of cardiac ischæmic pain with or without subsequent evidence of fresh myocardial infarction is considered by many to indicate extension of the original thrombosis in the coronary artery tree. Venous thrombosis in the lower extremities with resultant pulmonary embolism is a constant threat to life in the patient confined to bed. Particularly is this a real danger in the patient who has suffered a recent coronary thrombosis, for increased coagulability of blood had been reported as shown by the heparin-retarded clotting test (Waugh & Ruddick test).[20] Finally, anticoagulants such as heparin and dicoumarol administered to animals have been found to increase coronary blood flow.[21]

In 1938 Solandt and Best[22] demonstrated that heparin could prevent coronary thrombosis experimentally induced in animals. In 1939 Solandt, Nassim, and Best[23] showed experimentally that heparin prevented the development of mural thrombosis over an area of injured myocardium. They were first to suggest the possibility of using anticoagulant to prevent the extension of coronary thrombi and the development of mural thrombosis underlying infarction.

Sporadic clinical use of anticoagulants in treating recent myocardial infarction was tried prior to 1945. Several reports then appeared with uniformly favourable results.[24 to 28] This led in 1946 to the formation by the American Heart Association of the Committee for the Evaluation of Anticoagulants in the Treatment of Coronary Thrombosis with Myocardial Infarction. It was following the presentation of the preliminary report of this Committee[29] by Irvine S. Wright in June 1948 that the routine use of anticoagulants in such cases was instituted on the medical service of Toronto General Hospital.

This report deals with the result of 503 consecutive, clinically-proven attacks in 488 patients admitted during the 4 year period mid-1948 to mid-1952. For comparison, a control group of 242 attacks in 240 patients admitted during the 5½ year period 1947 to mid-1952 was studied; of these, 163 cases were admitted prior to mid-1948, when the routine use of anticoagulant therapy was begun. All patients who died within 48 hours after admission were eliminated from both series.

The anticoagulant administered was dicoumarol in 345 cases, intramuscular heparin in 35 cases, phenylindanedione (Danilone) in 50 cases, cyclocumarol (BL5) in 52 cases, heparin and dicoumarol in 9 cases, heparin and phenylindanedione in 2 cases, heparin and cyclocumarol in 1 case, Tromexan (ethyl biscoumacetate) in 7 cases, and Tromexan and later phenylindanedione in 1 case. The majority of patients had an initial control prothrombin time, and, subsequent to the loading doses of anticoagulant, it was attempted to maintain the prothrombin time 2 to 2½ times the simultaneous normal (usually 14-17 seconds), or between 10 and 30% of normal prothrombin activity. Anticoagulant dosage was regulated by daily prothrombin times done by the Quick (one stage) method, or, in the case of heparin, by daily clotting times done by the Lee and White method 4 hours after the morning dose. Anticoagulant therapy was continued until the patient became ambulatory.

The usual contraindications to anticoagulants were observed, *e.g.*, in patients with disturbances of the clotting mechanism, with peptic or other ulceration of the gastrointestinal tract, or with significant degrees of liver damage; where increased capillary fragility was encountered; or where the potential danger of hæmorrhage into a cerebral infarction existed. Vitamin K_1 or K_1 oxide 500 to 1,000 mgm. by mouth was found effective in restoring the markedly elevated prothrombin time to normal in a few hours when bleeding became troublesome. Seldom was transfusion of whole blood necessary.

The distribution of the treated and control groups according to sex in 4 age compartments is shown in Table I. The number of attacks ending fatally in each is indicated by the figures in brackets. It will be noticed that there is a higher

*From the Department of Medicine, University of Toronto and the Medical Service, Toronto General Hospital.
†Associate in Medicine, Faculty of Medicine, University of Toronto; Attending Physician, Toronto General Hospital.

proportion of females in the older age groups, as is customarily found in large series of cases of cardiac infarction. Further, there is a significantly higher mortality amongst females.

The mortality rate in the 503 anticoagulant treated attacks was 13.7% while that in the 242 controls was 31.0%. These rates are comparable to those reported by Mills[30] in Montreal of 13 and 23.4%, by Wright[31] from the American

TABLE I.

Treated group (22.6% females)

	Under 50	*50-59*	*60-69*	*70+*	*Total*	*Mortality rate*
Males.....	88 (5)	118 (16)	131 (17)	52 (11)	389 (49)	12.9%
Females.....	9 (0)	27 (2)	39 (6)	39 (12)	114 (20)	17.5%
Total....	97 (5)	145 (18)	170 (23)	91 (23)	503 (69)	13.7%

Control group (33.9% females)

	Under 50	*50-59*	*60-69*	*70+*	*Total*	*Mortality rate*
Males.....	25 (3)	41 (8)	54 (17)	38 (15)	160 (43)	25.6%
Females.....	8 (1)	11 (2)	29 (10)	34 (19)	82 (32)	39.0%
Total....	33 (4)	52 (10)	83 (27)	72 (34)	242 (75)	31.0%

Heart Association Group of 16.0 and 23.4%, and by Gilchrist[32] from Britain of 16.2 and 30.6% in the treated and control cases, respectively. However, the marked difference in mortality rate between the 13.7% of 503 treated attacks and the 31.0% of 242 control attacks is more apparent than real, Analysis of these two groups reveals that they are not strictly comparable in the

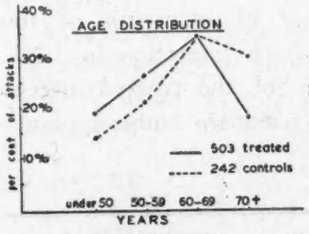


Fig. 1

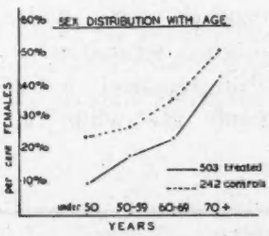


Fig. 2

factors which are known to increase the mortality rate during hospital treatment for an attack of cardiac infarction. The statistical probability of death from coronary thrombosis is materially influenced by such factors as age, sex, the presence of angina, previous infarction and pre-existing hypertension.[33]

Age.—Fig. 1 shows the age distribution in the 2 groups. The average age in the controls was 63 years while that in the treated group was 58 years.

Sex.—Females constituted 33.9% of the controls, but only 22.6% of those treated with anticoagulant. Fig. 2 shows that this higher proportion of females in the controls holds for each age subdivision. When fatal cases are considered by themselves, it is seen from Fig. 3 that a higher

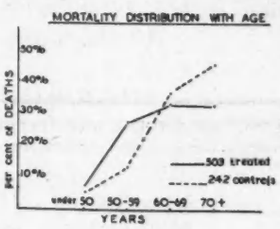


Fig. 3

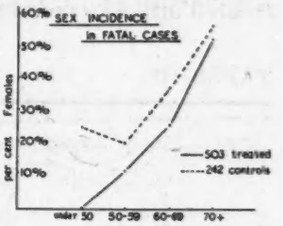


Fig. 4

percentage of deaths in controls were in older patients and from Fig. 4 that fatal cases in the controls had a higher proportion of females than did the treated group as might be expected from the higher proportion of females in the controls.

Previous infarction.—Table II shows that 26% of the controls and 24% of the treated had suffered previous myocardial infarction. The mortality in initial attacks was reduced from 28 to 12% while that in multiple attacks fell from 40% in the control series to 19% in the treated group.

TABLE II.

INFLUENCE OF MULTIPLE INFARCTIONS ON THE MORTALITY RATE

	Treated	*Controls*
No. of initial attacks....	382	177
No. of multiple attacks....	121 (24%)	63 (26%)
Mortality		
In initial attacks	(47 in 382) 12%	(50 in 177) 28%
In multiple attacks....	(23 in 121) 19%	(25 in 63) 40%

Angina and hypertension.—Table III shows the effect of angina and of hypertension on the mortality rate in the 2 groups. The incidences of angina (29 and 30%) and of hypertension (13 and 14%) were almost identical in the 2 groups. There was some reduction in mortality in the treated over the controls.

A striking feature, however, was the very marked reduction in mortality in the cases exhibiting neither angina nor hypertension in the anticoagulant-treated group. In the latter, 62% of attacks occurred in patients with neither angina nor hypertension with only 30 deaths (9.5% mortality). In the controls 66% of attacks occurred in this class with 50 deaths (33%

mortality). It seems likely that the beneficial effect of anticoagulant therapy in reducing mortality is most felt when neither angina nor hypertension is present, because of the marked suppression of thromboembolic phenomena in treated attacks (*vide infra*).

The incidence of *thromboembolic phenomena* in the 2 groups is illustrated in Fig. 5. In the control group, 22% of attacks were characterized by 1 or more clinically-significant thromboembolic episodes. In the treated series 12.7% of attacks showed such phenomena, but on closer scrutiny it was found that 3.2% were not on anticoagulant at the time of the episode, 6.3% were not on adequate anticoagulant, and only 3.2% were considered to be under adequate control by anticoagulant at the time the episode occurred. Mills[30] reported 9 and 18% thromboembolic episodes, Wright[31] reported 10.9 and 26.0% in the American Heart group, while Gilchrist[32] reported 9 and 21.8% of cases showed thromboembolic episodes in the anticoagulant-treated and control series respectively.

When *recurrent cardiac ischæmic pain* was singled out, it was found to occur in 10% of the controls with evidence of extension of the original infarction or fresh infarction in 3.3%. Pain recurred in 5.3% of the treated attacks (only 2% while on adequate anticoagulant) and there was evidence of further infarction in only 0.4%.

Pulmonary embolism occurred in 8% of controls and 3% of treated (only 0.6% while on

TABLE III.

EFFECT OF ANGINA AND HYPERTENSION ON THE MORTALITY RATE

	503 treated			*242 controls*		
	No.	*Deaths*	*Mortality*	*No.*	*Deaths*	*Mortality*
Hypertension alone	63	15	24%	34	9	27%
Angina alone	149	27	18%	69	19	28%
Hypertension and angina	23	3	13%	12	3	25%
Total hypertension and/or angina	189	39	21%	91	25	27%
Neither hypertension nor angina	313	30	9.5%	151	50	33%

Table IV shows a similar incidence of *diabetes* (9% and 11%) in the 2 groups. In this series of attacks of cardiac infarction, diabetes was roughly 3 times as frequent in the females as in the males. There was a marked reduction in the mortality in the diabetic with recent infarction treated with anticoagulant.

TABLE IV.

DIABETES IN CARDIAC INFARCTION CASES

	503 treated	*242 controls*
Male diabetics	25 in 389 (6.4%)	11 in 160 (7.0%)
Female diabetics	21 in 114 (18.5%)	16 in 82 (20%)
Total diabetics	46 in 503 (9.1%)	27 in 242 (11%)
Mortality		
Total diabetics	4 in 46 (8.7%)	8 in 27 (30%)
Non-diabetics	65 in 457 (14.2%)	67 in 215 (30%)
Total series	69 in 503 (13.7%)	75 in 242 (31%)

TABLE V.

SITE OF INFARCTION

	503 treated			*242 controls*			*Total cases*	
	No.	*%*	*Mortality*	*No.*	*%*	*Mortality*	*%*	*Mortality*
Anterior	236	47	14%	120	50	27%	48	19%
Posterior	179	36	13%	82	34	28%	35	18%
Septal	20	4	10%	14	6	36%	5	20%
Lateral	18	3.5	0	8	3	38%	3.5	12%
Extensive	13	2.5	23%	3	1	33%	2	25%
Not localized	37	7	16%	15	8	70%	7	31%
Total	503		13.7%	242		31.0%		19.3%

Table V shows that the *site of infarction* as determined by 1 or more electrocardiograms was roughly comparable in the 2 groups. A reduction in mortality was present in all subdivisions.

adequate anticoagulant). The only death directly due to embolism occurring while the patient was apparently under the influence of adequate anticoagulant (in this case dicoumarol) was due to pulmonary embolism.

Cerebral infarction was here considered as a group since it was impossible to decide in many cases whether cerebral softening was due to thrombosis or embolism (or to neither as seemed to be true in 1 case at necropsy). This occurred in 5.4% of the controls and 2.4% of the treated (only 1.2% while on adequate anticoagulant).

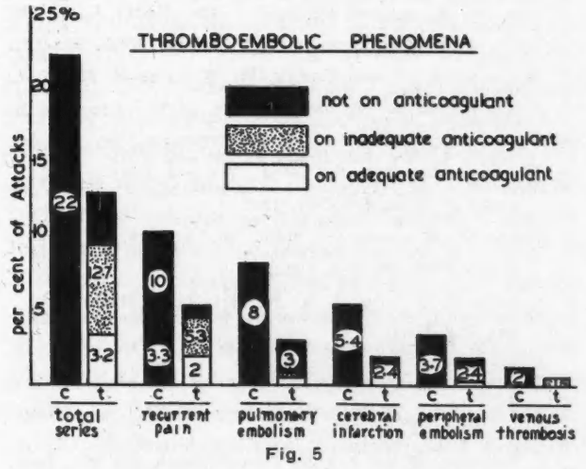


Fig. 5

Peripheral (including visceral) embolism occurred in 3.7% of the controls and 2.4% of the treated (only 0.4% while on adequate anticoagulant).

Venous thrombosis in lower extremities was apparent in 2% of controls and 1% of treated, none of whom were on adequate anticoagulants at the time.

TABLE VI.

HÆMORRHAGIC COMPLICATIONS IN 5% OF 503 ANTICOAGULANT TREATED CASES

Intracranial	4 (cause of death in 2)
Hæmaturia	12 gross (prothrombin % excessively low in 7)
Hæmatemesis	1 (from silent peptic ulcer)
Blood in stool	5 (transfusion in 1) (prothrombin % excessively low in 4)
Subcutaneous hæmatomas	2
Hæmarthrosis	1
Hæmorrhage into subpleural bleb	1

Hæmorrhagic complications occurred in 5% of anticoagulant treated cases (Table VI). They were considered the cause of death in 2 patients, both of whom were hypertensive and suffered fatal cerebral hæmorrhage while prothrombin was excessively depressed. Hæmorrhagic episodes occurred in 2% of the control series but resulted in no deaths. A history of bleeding was obtained in 6% of controls and resulted in anticoagulants being withheld from treatment of their attacks.

TABLE VII.

Cause of death	*503 treated*		*242 controls*	
1. Cardiac	*62*	*(90%)*	*55*	*(75%)*
Recurrent pain	7		4	
Sudden death	20		14	
Failure	32		35	
Heart block	1		1	
Ventricular tachycardia	—		1	
Ruptured septum	2		—	
2. Thromboembolism	*5*	*(7.5%)*	*19*	*(25%)*
Pulmonary embolism	1		2	
Cerebral infarction	1		9	
Mesenteric embolism	—		2	
Renal embolism	—		1	
Embolism to bifurcation of aorta	1		2	
Multiple embolism	2		3	
3. Hæmorrhage	*2*		*0*	
4. Other	*0*		*1*	
Total	69	(13.7%)	75	(31.0%)

Table VII lists the *causes of death* and demonstrates the marked reduction in fatal embolism from 25% of the 75 deaths in the control group (8% of the control attacks) to 7.5% of the 69 deaths in the treated group (1% of the treated attacks). Furthermore, anticoagulants were adequate in only 1 of the 5 deaths due to embolism. Thus 1.5% of the deaths were due to embolism and only 0.2% of attacks ended fatally from embolism while the patient was under the influence of adequate anticoagulant.

This series of cases was analyzed by the method of Russek *et al.*[34] These workers contend that the benefit from anticoagulant therapy in their so-called "good risk" cases is not commensurate with the expense and potential danger to the patient from interference with the clotting mechanism. In their series of "good risk" patients they point out anticoagulant could be expected to influence the outcome in about 1%. "Good risks" are those who during the first 24 hours of admission exhibit none of the following: (1) Intractable pain, (2) more than mild shock, (3) moderate or gross cardiac enlargement, (4) gallop rhythm, (5) failure, (6) arrhythmia of serious nature, (7) previous infarction, (8) angina longer than 1 month, (9) hypertension, and (10) diabetes or other serious disease.

Table VIII shows that 31% of 500 treated attacks fell into the "good risk" category with 2% deaths and 6% thromboembolism: 24% of 242 control attacks were of this category with 5% mortality and 11.5% thromboembolism. However, in the "poor risk" category the reduction in mortality rate of 40% in the controls to 19% in the treated and of thromboembolism from 24 to 15% (the majority of which were not adequately under anticoagulant influence at the time) seems much more significant.

TABLE VIII.

ANALYSIS OF SERIES BY METHOD OF RUSSEK

	500 treated	*242 controls*
"Good risk"	156 (31%)	58 (24%)
deaths	3 (2%)	3 (5%)
thr.-emb.	6%	11.5%
"Poor risk"	344 (69%)	184 (76%)
deaths	66 (19%)	71 (40%)
thr.-emb.	15%	24%

Necropsy findings of interest in these cases are summarized in Table IX.

TABLE IX.

NECROPSY FINDINGS

Number	*503 treated 30*	*242 controls 39*
Mural thrombus	13 (43%)	27 (69%)
Embolism total	3 (10%)	24 (62%)
clinically apparent	2	12
Hæmorrhage	5 (cause of death in 1)	4
Rupture of myocardium	4	0

CONCLUSION

Anticoagulant added to the regimen of therapy for recent myocardial infarction is distinctly advantageous when administered under ideal conditions of adequate daily control in a large general hospital. The lessened mortality rate and decreased incidence of thromboembolic phenomena applies to all categories, but is particularly apparent in complicated or "poor risk" patients. Hæmorrhage is not a serious threat to the outcome provided reasonable care is exercised in the selection of patients for, and the control of, anticoagulant.

REFERENCES

1. WOLFF, L. AND WHITE, P. D.: *Boston Med. & Surg. J.*, 195: 13, 1926.
2. PARKINSON, J. AND BEDFORD, D. E.: *Lancet*, 1: 4, 1928.
3. LEVINE, S. A.: *Medicine*, 8: 245, 1929.
4. CONNOR, L. A. AND HOLT, E.: *Am. Heart J.*, 5: 705, 1930.
5. LISA, J. R. AND RING, A.: *Arch. Int. Med.*, 50: 131, 1932.
6. MEAKINS, J. C. AND EAKIN, W. W.: *Canad. M. A. J.*, 26: 18, 1932.
7. HARRINGTON, A. W. AND WRIGHT, J. H.: *Glasgow M. J.*, 119: 1, 1933.
8. SAPHIR, O., PRIEST, W. S., HAMBURGER, W. W. AND KATZ, L. N.: *Am. Heart J.*, 10: 567, 1935.
9. BLUMER, G.: *Ann. Int. Med.*, 11: 499, 1937.
10. MASTER, A. M., DACK, S. AND JAFFE, H. L.: *New York State J. Med.*, 37: 1707, 1937.
11. *Idem*: *Arch. Int. Med.*, 64: 767, 1939.
12. BEAN, W. B.: *Ann. Int. Med.*, 12: 71, 1938.
13. WOODS, R. M. AND BARNES, A. R.: *Proc. Staff Meet., Mayo Clin.*, 16: 341, 1941.
14. *Idem*: *Am. Heart J.*, 24: 4, 1942.
15. GARVIN, C. F.: *Am. J. M. Sc.*, 201: 412, 1941.
16. ROSENBAUM, F. F. AND LEVINE, S. A.: *Arch. Int. Med.*, 68: 913, 1941.
17. NAY, R. M. AND BARNES, A. R.: *Am. Heart J.*, 30: 65, 1945.
18. MINTZ, S. S. AND KATZ, L. N.: *Arch. Int. Med.*, 80: 205, 1947.
19. HELLERSTEIN, H. K. AND MARTIN, J. W.: *Am. Heart J.*, 33: 443, 1947.
20. OGURA, J. H., FETTER, N. R., BLANKENHORN, M. A. AND GLUECK, H. I.: *J. Clin. Investigation*, 25: 586, 1946.
21. GILBERT, N. C. AND NALEFSKI, L. A.: *J. Lab. & Clin. Med.*, 34: 797, 1949.
22. SOLANDT, D. Y. AND BEST, C. H.: *Lancet*, 2: 130, 1938.
23. SOLANDT, D. Y., NASSIM, R. AND BEST, C. H.: *Lancet*, 2: 592, 1939.
24. WRIGHT, I. S.: *Proc. Am. Federation Clin. Research*, 2: 101, 1945.
25. NICHOL, E. S. AND PAGE, S. W. JR.: *J. Florida M. A.*, 32: 365, 1946.
26. PETERS, H. R., GUYTHER, J. R. AND BRAMBEL, C. E.: *J. A. M. A.*, 130: 398, 1946.
27. WRIGHT, I. S.: *Am. Heart J.*, 32: 20, 1946.
28. *Idem*: *Tr. A. Am. Physicians*, 59: 47, 1946.
29. WRIGHT, I. S., MARPLE, C. D. AND BECK, D. F.: *Am. Heart J.*, 36: 801, 1948; *J. A. M. A.*, 138: 1074, 1948.
30. MILLS, E. S.: *Canad. M. A. J.*, 68: 6, 1953.
31. WRIGHT, I. S.: *Circulation*, 2: 927, 1950.
32. GILCHRIST, A. R.: *Brit. M. J.*, 2: 351, 1952.
33. DOSCHER, N. AND POINDEXTER, C. A.: *Am. J. Med.*, 8: 623, 1950.
34. RUSSEK, H. I., ZOHMAN, B. L., WHITE, L. G. AND DOERNER, A. A.: *J. A. M. A.*, 145: 390, 1951.

THE TREATMENT OF ATHLETIC INJURIES*

NORMAN C. DELARUE, M.D., *Toronto*

THE INJURIES suffered by athletes in competition are found to affect primarily the soft tissues of the body, being represented almost entirely by lesions of muscles, tendons, and ligamentous joint supports. Fractures are relatively uncommon and it is largely for this reason that in the past the treatment of these conditions fell into the hands of "trainers," "rubbers," "bone-setters" and other soft tissue therapists who, by their skill in handling soft tissue injuries, were able to accelerate the recovery of the patient and return him to competitive activity much sooner than the physician. This stemmed from the reliance the physician tended to place on the accepted procedure of resting the damaged part until

*From the Department of Surgery, Toronto General Hospital. Presented at the Annual Meeting of the Canadian Association of Physical Medicine and Rehabilitation, June 5, 1953.

healing had occurred without attempting to alter the eventual outcome as it affected the elapsed time or the residual defect, by adopting physiological methods in dealing with the pathological state.

It was not until the turn of the century that "team physicians" responsible for the care of all injured players were finally accepted as having their proper place in the management of these problems. Following the original demonstration at Harvard University that an interested medical appraisal with intelligent advice led to a remarkable decrease in the number and severity of injuries during the season, it became common practice for all large universities to maintain medical departments responsible for the proper training and adequate protection of athletes, and early attention to all injuries. Despite the impressive improvement obtained in the overall picture, athletes as a group still tend to prefer the treatment of the trainer or other specialist in soft tissue therapy to that of the average physician, for many a coach or trainer can still recall with horror the shrunken, weakened limb that resulted when the principle of rest was applied under the protection of a plaster cast.

Nonetheless the team physician has a fundamental niche in the success of the team, provided he adjusts his consideration of any injury in the light of his team responsibility. The treatment of the injury, particularly in professional athletes, must be coloured by the fact that it is important both to the athlete and to the team that he be returned to useful participation in the sport at the earliest possible moment. This involves an intelligent appraisal of the injury, active therapy along physiological lines, and release for play only when there is no residual danger of aggravating the injury. Possibly the most important function of the physician lies in his determination of this end point, for if the athlete is returned too soon and recurrence develops then permanently weakened joint ligaments or muscle tissue may result with unstable joints and limitation of sustained physical activity. As emphasized so many times in the past, "trick joints" that "give way" or "go out" are the dread of every athlete, and particularly those who earn their livelihood as a result of their physical prowess. At the same time, it is just as important that the medical advice be not over-cautious, for most seasons are short and even a few days extra invalidism, when one wants to "play safe", may do irreparable harm to the athlete's training and the smooth functioning of the team as a successful unit.

The ideal arrangement implies one of the utmost confidence between management, coach, and physician without undue pressure from the management, whose considerate interest will speed the recovery by spurring the efforts of both physician and athlete. The coach should be responsible only for the athletic training and conditioning of the team, and the physician for the medical condition of each individual member.

Probably in no other field of medical practice is prevention of injury so important not only to the patient but also in so far as it affects the other team members, upon whom additional strain is thrown in attempting to make up for his loss; the coach who must alter his plans and training arrangements to fit this man power shortage; the management, who are responsible for finding adequate replacements for a period of time that is often difficult to predict accurately; and of course the fans who expect and deserve the best performance that the team can produce working at peak efficiency. In order to effect this protection against injury all teams now undergo a rigorous training schedule before the playing season begins during which time carefully selected exercises must be stressed for the specific purpose of strengthening muscles that will support those joints peculiarly susceptible to strain in the particular game being played. These exercises are carried out in addition to those which are designed to improve the general condition of the athlete, in the so-called "hardening-up process". Taking hockey as an example of a body contact type of sport, it is particularly important in this period of training to perform quadriceps exercises in order to provide maximum protection for the knee which is the joint most susceptible to injury in this high speed game.

Proper treatment of the actual injury must be predicated on a sound appreciation of the pathological changes that develop as a result of the injury. Initially the tissue disruption is accompanied by hæmorrhage, followed, when the active bleeding has ceased, by the development of an inflammatory reaction in response to the damaged tissue and the extravasated blood. This is represented by local dilatation of vessels, infiltration of macrophages and inflammatory cells, and the development of tissue œdema due

Canad. M. A. J.
April 1954, vol. 70

in part to the lymphatic occlusion by debris in the interstitial spaces and consequent inability of the lymphatic channels to drain adequately the collected exudate and tissue fluid transudate, which is present in addition to the accumulation of blood and the products of tissue autolysis. Very soon thereafter the area is invaded by granulation tissue as absorption takes place, and finally healing occurs with the development of scar with its resultant contraction producing limited elasticity of the involved tissue and weakness in response to strain. There are then four fundamental stages in these soft tissue injuries whether they be muscle strains or contusions or ligamentous sprains: (1) tissue damage and hæmorrhage; (2) inflammatory reaction and swelling; (3) granulation tissue organization; and (4) scar production.

Because the dangers of recurrent disability and muscle and ligament weakness depend upon the development of excessive scar, treatment must be designed to minimize the hæmorrhage and inflammatory reaction so that there will be as little granulation tissue formed as possible. Nothing can be done, of course, to prevent the effect of the initial injury apart from making sure that further damage does not occur.

Treatment must also be based upon a correct anatomical diagnosis and the team surgeon who sees the patient within a few moments of the actual injury has an ideal opportunity of assessing the amount of damage at that time. Immediately upon receipt of the trauma protective muscles develop a reflex atonia, which the patient is unable to control, and, in addition, the initial stunning of the sensory nerves in the vicinity is still present, so that manipulation produces little discomfort. Consequently, a relatively painless straining of the torn ligament is possible without efficient muscular resistance, and these two factors allow a better clinical testing of the integrity of the ligament than at any subsequent period in recovery. Once protective muscle spasm develops a local anæsthetic may well be necessary to allow a satisfactory examination of the affected ligament.

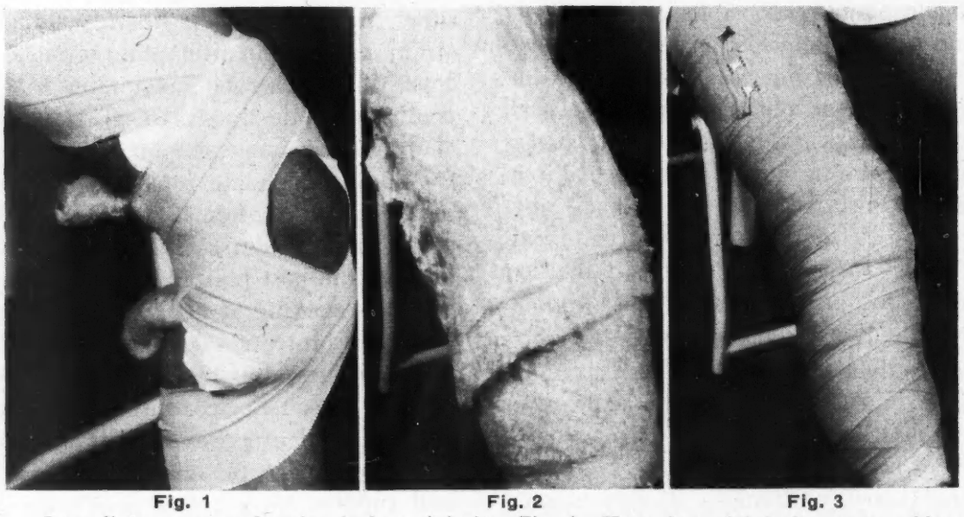


Fig. 1 Fig. 2 Fig. 3

Immediate pressure dressing in knee injuries. **Fig. 1.**—Horseshoe of 1 inch sponge rubber cut to cover suprapatellar pouch with lateral extensions to cover line of collateral ligaments. Pad of non-absorbent cotton in popliteal fossa. Two encircling strips of 3 inch elasticized adhesive bandage used to provide pressure, each crossing suprapatellar region running behind popliteal fossa and covering lateral extension of the sponge rubber pad on the opposite side of the knee, to be anchored on the calf below the knee region. This pressure dressing may be immersed in ice water or bandaged in ice bags. **Fig. 2.**—Roll of non-absorbent cotton applied from below mid-calf to above mid-thigh. **Fig. 3.**—Compression applied to non-absorbent padding using two elastic bandages under the maximum tension compatible with preservation of circulatory requirements distal to the bandage.

In treatment during the first stage, hæmorrhage can be best controlled by local pressure and by diminishing the blood supply to the involved part. This latter effect is accomplished by lowering the temperature locally, thus producing vasospasm at the site of the injury. As an additional precaution, of course, the area is rested to prevent further damage by unguarded movements. Consequently, in the immediate therapy, pressure is applied to the point of injury as accurately as possible, utilizing 1-inch sponge rubber maintained tightly in position by suitably applied strips of elastoplast under considerable tension. The entire part, including the pressure

bandage, is then immersed in water in which chunks of ice are floating, or if it is technically impossible to carry out this procedure ice bags or heavy towels with finely chipped ice are utilized, being held in place by a circular elastic bandage. The part is nursed in a position of comfort and relaxation and protected from sudden unguarded movements.

After maintaining the pressure and ice applications for thirty minutes to one hour the initial dressing is removed, and a similar pressure bandage applied under moderate tension, and this time with additional elastic compression over a copious amount of non-absorbent padding so that a considerable degree of pressure can be applied without cutting off the blood supply to distal parts of the limb. This type of bandage has the additional advantage of being sufficiently solid to provide adequate support to the injured muscle or joint so that further injury is unlikely. At this stage the affected part should be elevated in a further attempt to diminish the risk of continuing hæmorrhage and increasing swelling, taking advantage of the reflex vasospasm that occurs with gravitational venous emptying on elevation.

The compression bandage is maintained for 24 hours, at which time the area is inspected and the degree of injury re-evaluated. It is usually unwise to give a definite opinion regarding the severity of the lesion until one has had opportunity of reassessing the damage sustained at this time.

Once the hæmorrhage has been thus controlled attention is directed to speeding the absorption of the extravasated blood and the associated exudate and debris. This is accomplished by increasing lymphatic and vascular drainage from the affected part, and the methods of applying local heat, massage, and graduated exercises are all designed with this end in view. Heat which acts by producing vascular dilatation in the tissue surrounding the damaged area is probably best applied in the whirlpool bath, combining as it does the advantages of moist heat and gentle massage. But if this form of heating is unavailable shortwave diathermy may be used as a satisfactory alternative.

Massage accomplishes the same purpose of producing vascular dilatation as does the application of heat, but it has one distinct advantage in that it disperses the effusion and debris that is occupying the tissue spaces in the swollen area by actual manual effect. This movement of the various constituents of the reactionary process into the more normal adjacent tissue allows them access to functioning lymphatic channels and dilated vascular channels through both of which absorption may proceed more rapidly. In this acceleration of the absorption process it is important to remember that gentleness is essential. During the first 48 hours after the injury both heat and massage should be confined to the tissues surrounding the actual local area of injury to prevent stimulation of further bleeding, or the production of additional trauma. After the third day, these treatments may be applied directly to the damaged area and the consequent dispersal of the swelling accomplished with increasing speed and efficiency. It cannot be stressed too strongly that at no time during this period should the massage be vigorous or painful, for this merely produces more damage and accomplishes no useful purpose, only serving to prolong the period of disability unnecessarily.

Muscle exercises similarly aid in the absorption of the debris, probably to a degree which has not been generally appreciated previously. It has been realized for a long time that normally venous blood and lymph gain egress from both upper and lower limbs largely as a result of the expressing effect of muscle massage within the relatively rigid confines of the deep fascia. Similarly, in the area of injury, once the dispersal effected by local massage has taken place, this emptying of the draining lymphatics and to a lesser extent the venous tree by active muscle exercise will appreciably hasten the disappearance of the inflammatory reaction. This muscle activity has the added advantage of producing further massage at the actual site of trauma and thus further dispersal of the components of the swelling. Not only will these exercises play their part in relieving the swelling but they will also help to maintain the tone and strength of the muscles in the vicinity of the injury. Ordinarily complete rest in a plaster support allows the muscle, originally in spasm as a result of the injury and the guarding necessary to prevent aggravation of pain with any movement, to become atonic and develop a rapidly progressive atrophy, so that when the plaster is removed the essential protection afforded by a healthy strong supporting musculature is lacking and re-injury is possible without a lengthy period of exercise and re-education of the involved muscle.

Canad. M. A. J.
April 1954, vol. 70

A bulky compression bandage such as that described above provides sufficient support to prevent further injury and has the advantage of allowing a slight amount of early movement with the possibility of daily removal for the application of heat and massage and supervision of graded muscle exercises. Nothing stimulates more intense effort on the part of an intelligent athlete, highly motivated towards an early recovery, than the opportunity of seeing for himself the progress that is occurring. This provides an appreciation on his part of the underlying principles of treatment, which is absolutely impossible with plaster immobilization. It remains a fundamental aphorism that the use of plaster has no place in the treatment of these soft tissue injuries of athletes.

It is important also to remember that while the damaged part is under treatment there is no contra-indication to maintaining the general physical fitness of the athlete and the strength of muscles not specifically involved in the injury. Consequently, tension and resistance exercises are prescribed for limbs not incapacitated while he is confined to bed, and as soon as the patient is ambulatory a more vigorous regimen is instituted. If for instance the upper limb is affected running will keep the legs in condition and maintain the reserve that has been built up during the previous training schedule.

A recent adjunct to our armamentarium, in the availability of the "spreading factor" hyaluronidase in commercial preparations, gives promise of proving of invaluable aid in handling the more serious of these ligamentous sprains and muscle strains or contusions. With recognition of dispersal of the inflammatory exudate as a fundamental factor in the healing process hyaluronidase would seem to represent an ideal agent in helping to accomplish this purpose. It has been felt that it should not be used in the first 24 to 48 hours after injury when there is any possibility of further hæmorrhage and because there appears to be a tendency for reactionary œdema to develop subsequently distal to any constricting bandage if it is used during the phase of acute swelling. However, if on reassessment of the injury 24 to 48 hours later, there is an appreciable degree of swelling despite the early application of cold and compression, the eventual scarring can be minimized by the additional use of this spreading factor. Ordinarily approximately 20 to 30 c.c. of solution (usually ½% local anæsthetic because of its painless use) is made up containing one ampoule of a commercial preparation of hyaluronidase, and this solution is injected directly into the central area of the swelling. The remarkable regression that may occur is so striking as to be almost unbelievable particularly in superficially situated lesions, such as ligamentous sprains. In muscle contusion or strain the obvious change is less apparent, but the subjective improvement suggests that a similar relief of tension occurs and the continued use of these preparations seems warranted. If minimal swelling is present after the initial treatment, however, it is not felt that solutions of this kind will further accelerate the recovery and reliance is placed on the use of heat, massage and exercise alone.

In an injury of average severity a period of 10 days to 3 weeks will see recovery proceed to the point where it is considered safe to allow the athlete to return to team activity. During the latter part of the convalescence weight bearing in leg injuries, and resistance exercises in arm lesions, play an important role in bringing the tone and strength of involved or protecting muscles back to normal levels. When walking, the affected muscle or joint must be protected from additional insult, and in injuries to the medial collateral ligament of the knee for instance the patient is given an elastic supporting bandage for the knee, a protective internal heel lift of wedge type, and instructed to walk stiff-legged until recovery is complete. Similar supporting bandages can be utilized for other joints and resistance exercises are arranged in both upper and lower limbs, so that undue motion does not occur at the damaged joint, or produce undue stretching of the affected muscles.

Upon return to the game the injured area must be protected from further harm particularly in body contact sport and this necessitates the use of adhesive strapping, such as that discussed subsequently for ligament injuries at the knee. The elastic bandages used for compression in the early stages of recovery whether they be of bandage or adhesive type do not afford sufficient strength and support in the degree of tension which is safe to use, especially if the limb is to be encircled. If excessive tension is allowed the distal structures may show the effects of vascular occlusion (swelling, cramps, and easy fatiguability) and if the elasticised adhesive is applied directly to the skin as is essential for any effec-

tive support, skin irritation with blistering is very likely to result.

In applying the protective strapping the adhesive must actually provide support for the scarred area, and if straining the ligament or muscle under the strapping produces actual pain, or if sufficient mobility is allowed in the direction in which the original damage was produced to allow aggravation of the injury, then the support is not satisfactory. A poorly or improperly applied strapping is worse than useless, because, not only does it not perform its express function, but it may actually increase the likelihood of additional trauma by making the semi-supported joint stiff and awkward, lacking the normal smooth functioning of the joint, the supporting ligaments, and the protecting muscles in response to strain.

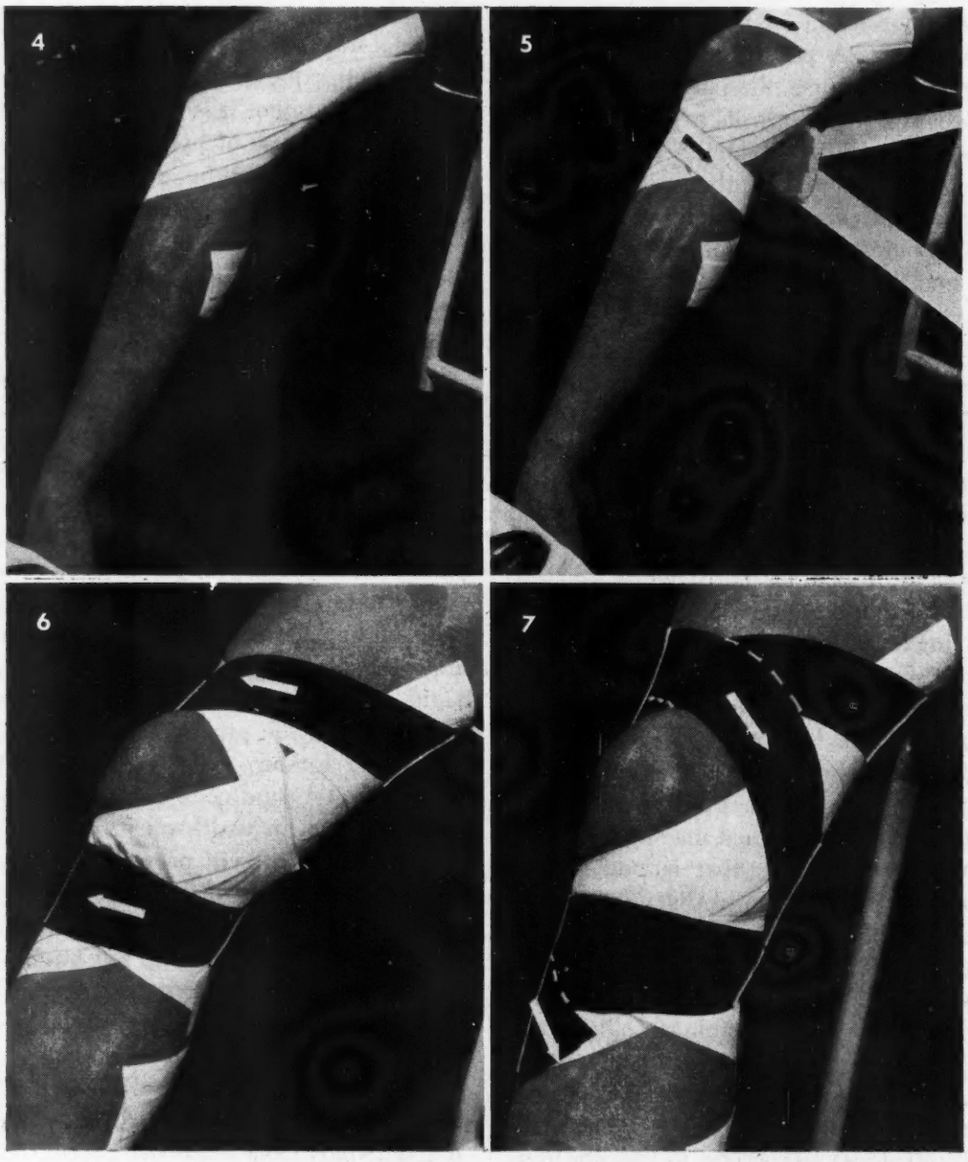
In very minor ligamentous injury, particularly of the knee and ankle, when the clinical examination performed initially or under local anæsthesia shows no instability of the joint or weakness of the ligament, the diagnosis of a partial tear being made, it is possible to allow weight-bearing immediately the swelling has been controlled and the danger of additional hæmorrhage has abated. In adopting this more active regimen pain is controlled by injection of local anæsthetic usually in 1 to 2% strength directly into the area of tissue disruption and the other methods of supporting compression, heat and massage utilized to the full. The relief of pain allows weight-bearing exercises and these produce the most efficient and most physiological massaging action of the functioning muscles that is possible, so that dispersal and absorption of the accumulated blood, debris and effusion is performed more rapidly, thus accelerating the eventual recovery and minimizing the residual disability. In this type of injury it is permissible to allow the athlete to continue participating in the game wearing a very carefully applied adhesive protective strapping during play. The area involved is injected with local anæsthetic in 2% strength before applying the strapping, and usually a few drops of 1/1,000 adrenaline solution are added to the anæsthetic preparation to delay its absorption thus prolonging the anæsthesia for the full period of the game. Although hyaluronidase will produce more rapid relief of pain immediately, with considerably greater ease of administration due to the fact that it is not so important to place the needle accurately in the actual area of damage with the use of this spreading factor, the rapid diffusion of the solution allows the effect to wear off more quickly and frequently long before the end of the game. Compensation for this diffusion effect is apparently only partially provided by the addition of adrenaline to the solution. Thus replacement of the strapping as well as a second injection of anæsthetic may be necessary, both of which additional factors produce unnecessary delays in the athlete's participation in the game. At this stage in treatment it is felt that there is no indication for the use of hyaluronidase and that the enzyme should not be used merely because it makes it easier to induce anæsthesia.

Braces and protective appliances have been designed in a variety of forms, none of which approach in flexibility or support the protection afforded by adhesive strapping properly applied. Apart from the very necessary protection provided by modern uniforms, helmets, shoulder pads, kidney pads and so on, which are all scientifically designed to protect the athlete from the effects of local contusion, specialized braces which are made rigid enough to prevent twisting injury do not permit an adequate freedom of joint motion, so that it is very seldom that they have any place in the treatment of an athletic injury. Occasionally with wrist injuries, in which rigid support is desired, a leather gauntlet extending from the proximal palmar skin crease to the upper forearm, lacing up the back, and incorporating a rigid cock-up metal splint approximately 1-inch in width on its volar aspect, may be utilized, as it will prevent flexion, extension and lateral bending of the wrist whilst permitting rotation at the radio-ulnar joint and allowing a firmer grip to be applied to any stick used in the game. Then too in preventing undue abduction of the shoulder after glenohumeral dislocation an armlet attached to the body by encircling straps may prove useful and easier of application than a similar restricting device made of adhesive. Apart from these two conditions there are almost no indications for the use of manufactured supports in the treatment of sprains, strains or contusions.

Because the knee is the joint most frequently injured in active sports the accompanying illustrations are presented demonstrating the application of the above principles to the treatment of ligamentous injuries of this joint. In knee joint lesions a complete examination includes an

Canad. M. A. J.
April 1954, vol. 70

evaluation of the integrity of the collateral and cruciate ligaments, testing for cartilaginous tears and displacements and the presence of synovial effusion or hemarthrosis, with a final assessment of the functional activity of the quadriceps and hamstring musculature. The diagnosis of muscle and ligamentous damage is usually fairly straightforward, but it is important to realize that an accurate determination of the presence or absence of cartilage tears of minor type is often very difficult indeed. It is the exception rather than the rule for one to encounter a bucket-handle displacement as the result of a sudden severe injury with a textbook story of



Protective adhesive strapping following medial collateral ligament injuries. **Fig. 4.** (Stage 1).—Leg shaved from mid-calf to mid-thigh and skin covered with protective coating of tincture benzoin co. Knee flexed 25 to 30 degrees with tibia held in position of maximum internal rotation preferably by assistant grasping ankle and lower tibial regions. Strips of 1½ or 2 inch adhesive applied as demonstrated extending from lateral margin of patella to medial hamstring tendons at joint level. On straightening knee and relaxing internal rotation the adhesive bands, and particularly the important posterior components, became taut over the area of ligamentous injury. **Fig. 5.** (Stage 2).—Sponge rubber pad 3 inches in width covering popliteal fossa between posterior limits of both collateral ligaments anchored by split ends of a 3" adhesive band backing the pad. The anchoring bands must not approach within 1 inch of the upper and lower margin of the patella but are at least 12 to 14 inches in length in order to stabilize the ends of the original adhesive bands over the medial collateral ligament. **Fig. 6.** (Stage 3).—Additional strips of 1 inch adhesive (black in photograph) applied to strengthen strapping and stabilize knee generally. Four strips, used as shown, beginning at upper end of original strapping crossing above patella and then behind popliteal region to pass around inner aspect of leg below patella ending at mid-lateral point of upper calf. **Fig. 7.** (Stage 4).—Second stabilizing band of four 1 inch adhesive strips applied as already described but in opposite direction.

locking, and much more frequently the subjective complaints are vague and poorly described, being represented by recurrent discomfort along the inner side of the joint with a sensation of weakness or "giving-way" of the joint on certain movements. The frequency of these less extensive but nonetheless debilitating injuries stems from the fact that recurrent minor external rotation abduction strains of the knee joint may loosen the marginal attachment of the medial cartilage, allowing abnormal displacement of the cartilage towards the intercondyloid region so that on subsequent strains of similar type the cartilage comes to lie between the weight-bearing surfaces of the femoral and tibial condyles. If the external rotation abduction stress now occurs during weight bearing the free margin of the cartilage may be caught between the condyles and a marginal tear results, this type of lesion being most commonly encountered towards the posterior horn of the cartilage. Often synovial effusion may be the first evidence of this abnormal mobility of the cartilage and should put one on guard regarding the possibility of future cartilaginous damage.

Protective adhesive strapping following medial collateral ligament injuries. **Fig. 8.** (Stage 5).—Adhesive strapping covered by pliable elastic bandage under moderate tension to maintain smooth application of adhesive to underlying skin.

The medial collateral ligament is the supporting structure of the knee joint most commonly injured and has been chosen for illustration. All grades of damage may be produced from partial tears without any instability, to complete ruptures with gross instability detected on physical examination by the peculiar "clunking" sensation as the medial femoral and tibial condyles are rocked apart on abduction straining of the fully extended joint with opening up of the medial compartment. In partial tears external rotation with the knee flexed about 30 degrees is the most delicate test for tissue damage, producing sharp, well localized pain at the site of the tear. Even when gross instability is detected there is no indication for surgical exploration unless an associated cartilaginous injury is suspected. Provided conservative treatment, as outlined above, is continued for a sufficient length of time (8 to 10 weeks) healing takes place and complete stability is recovered once the quadriceps power has been restored with a continuous regimen of exercises of graduated type. The athlete returns to competitive activity more quickly when handled conservatively than when surgical repair of the damaged ligament is carried out, due to the necessity in these cases for plaster immobilization in the postoperative period. The cruciate ligament injury that accompanies complete medial collateral ligament tears can be fully masked by a powerful protective quadriceps muscle and has not prevented participation in body contact sport even when the weakness can be detected clinically in the presence of relaxation of the quadriceps musculature.

In the case of the knee joint probably more than with any other joint injury the eventual recovery depends to a large degree on the support afforded by a strong quadriceps muscle. Consequently, tension exercises are begun at once, regardless of the nature of the injury, and graduated activity prescribed as the inflammatory reaction subsides, commencing with straight-leg raising, finally with resistance, and progressing to knee-bending exercises again eventually with resistance. As soon as possible when local discomfort permits and stability is assured walking exercises are allowed initially with a stiff knee, additionally supported by an elastic bandage, and as soon as possible in normal fashion. Once the protection afforded by the stability of the completely extended position is discontinued it is wise to prescribe a 3/16" inner heel wedge to protect the damaged ligament against subsequent abduction strain. The protective strap-

ping illustrated in the accompanying pictures is specifically designed to afford resistance to further external rotation abduction strain before the stress is applied directly to the previously injured ligament and should be worn during all competitive activity of strenuous type for a period of ten days to three weeks after clinical appraisal has adjudged that healing has occurred and joint stability been recovered.

SUMMARY

1. The physician who accepts responsibility in dealing with athletic injuries must adopt methods of therapy designed to accelerate recovery and enable the athlete to return to competitive activity at the earliest possible moment.

2. He has the additional responsibility of ensuring that healing has progressed to the point at which no increased tendency to recurrence or aggravation of the injury will persist when the athlete re-enters competition.

3. The principles of therapy of these soft tissue injuries depend upon an appreciation of the four fundamental stages in the development and healing of the traumatic lesion. (1) Tissue disruption and hæmorrhage. (2) Inflammatory reaction and swelling. (3) Granulation tissue organization. (4) Scar contracture.

4. The amount of eventual scar produced determines the degree of weakness and instability that may persist and consequently treatment is designed to diminish the scar tissue production by limiting or dispersing the area of swelling that is eventually replaced by granulation tissue.

5. This is accomplished by control of hæmorrhage and acceleration of the absorption and dispersal of the components of the reactionary swelling.

6. On return to the sport the damaged muscle or ligament must be protected from further injury by adhesive strapping properly applied. There is very little indication for the use of prepared splints and braces.

7. The methods described are illustrated by photographs demonstrating their application in the treatment of injuries to the medial collateral ligament of the knee joint.

8. The fact that intelligent athletes highly motivated in their desire to return to the game, and deeply aware of the dangers to their career, inherent in the development of scar weakening of muscles and ligaments, often prefer the treatment of "rubbers," "trainers," and other soft tissue therapists to that of the average physician, suggests that a reappraisal of treatment by rest alone is indicated. The value of active therapy cannot be over-emphasized.

CORONARY EMBOLISM WITH UNUSUAL FEATURES*

HAROLD N. SEGALL, M.D., F.A.C.P. and MORTIMER HARRIS, M.D., *Montreal*

THE PATIENT whose case is being reported presented a rare combination of phenomena. The autopsy confirmed the clinical diagnosis of non-bacterial emboli to cerebral, femoral and coronary arteries. There was clinical evidence indicative of rheumatic heart disease with button-hole type of mitral stenosis and slight aortic stenosis and insufficiency. The terminal illness was due to coronary artery ambolism and was preceded by events which at first strongly suggested subacute bacterial endocarditis; then the clinical evidence favoured the view that a non-bacterial thrombus was the source of emboli.

In 1936 Louis Gross[2] and Charles Friedberg analyzed 47 cases of non-bacterial thrombotic endocarditis; only two of these showed rheumatic valvular disease. In 1951 Raymond Daley[1] and his associates analyzed 194 cases of rheumatic heart disease in which systemic embolism occurred 393 times; not one of these had coronary artery embolism. These cases were observed by Paul D. White and Edward F. Bland between 1923 and 1950. Fifty-one cases of mitral stenosis in which there were mural thrombi were reported by Jordan[4] and associates in 1951; embolism occurred 96 times in this group and there was no single instance of coronary artery involvement. The subject of coronary embolism was well reviewed by Louis Hamman[3] in his Lewis A. Conner Lecture in 1940. He

*From the Departments of Medicine and Cardiology, Jewish General Hospital, Montreal, Canada.

remarked that, "In the index of the pathologic records of Johns Hopkins Hospital the diagnosis of coronary embolism appears for the first time in 1931. During the nine succeeding years the diagnosis has been entered ten times." In this lecture he analyzed 40 cases, 19 recorded in the article by Otto Saphir[6] (1932), 11 found in the literature published between 1932 and 1940 and 10 observed at Johns Hopkins Hospital. Moragues[5] and associates recently reported the case of a 43 year old man who lived for two months after embolism of the anterior descending branch of the left coronary artery; the embolus consisted of a calcific mass which arose from the calcified, stenosed aortic valve. These authors mention four reports of coronary embolism subsequent to Hamman's review of the literature. The patient we observed is the only one in our experience in which the clinical diagnosis could be made and the only one to be found in the

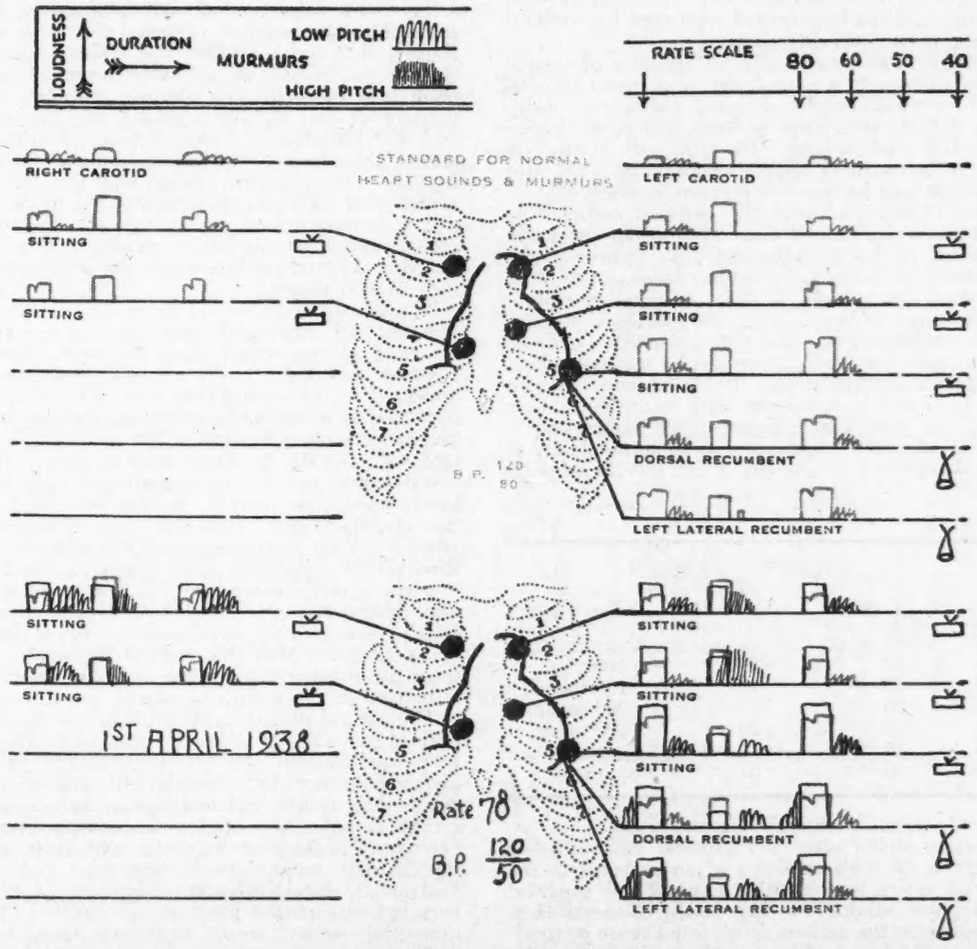


Fig. 1.—Heart sounds and murmurs described by quantitative symbols written while listening. The principles of the method are illustrated in the upper chart. Loudness is described by the ordinate and duration along the abscissa. The sounds are represented by rectangles. The murmurs are described by waves of vertical lines, rather widely separated for low pitched rumbling murmurs and closely packed for high pitched blowing murmurs. The standard normal sounds for each of the five precordial areas over which the stethoscope is placed are printed faintly and the symbols for the sounds and murmurs in the given case are written over these standard symbols. An arbitrary scale guides in depicting heart rate. Symbols on the side representing diaphragm and bell stethoscope chest pieces show which was used at each area.

The lower chart shows what was heard in this case on April 1, 1938. Note the first sound at apex is louder and the second sound less loud than the normal. The systolic murmur is coarse, low pitched and loudest at the aortic area, but it does not mask the first sound. No systolic murmur was heard at the apex in the dorsal and left lateral recumbent postures and only a short faint early systolic murmur was found in the sitting posture. The blowing aortic diastolic murmur was heard immediately after the second sound along both borders of the sternum and was loudest near the fourth intercostal space. It was not heard at the apex where there is an interval of quiet between the faint second sound and the beginning of the decrescendo phase of the mitral diastolic murmur; this was followed by a brief interval of quiet, then the crescendo presystolic phase of the mitral diastolic murmur was heard. The second sound was everywhere somewhat less loud and shorter than the normal and was not split, nor was there a third sound or opening snap of the mitral valve.

The relative loudness and duration of the sounds and murmurs at each of the five areas of auscultation are best depicted by the symbols which provide more details than could be seized if the description were made with words.

autopsy records of our hospital (1934-1952, 1,753 autopsies).

CASE REPORT

Our patient was born in Lithuania in 1908 and had rheumatic fever there at ten. He came to Canada in 1929. He was first told he had a heart murmur at seventeen; tonsillectomy was done in 1934 and appendectomy in 1937. He was first seen by one of us (H.N.S.) in 1938: a decrescendo-crescendo murmur of button-hole type mitral stenosis and systolic and diastolic murmurs of slight aortic stenosis and insufficiency were heard (Fig. 1). He complained of some fatigue and rheumatic aching when the weather changed. He continued as a clerk in a grocery store in Glace Bay, N.S., but avoided heavy lifting. In 1944 he required treatment for urethral and prostatic gonococcal infection.

In March of 1946 occasional brief episodes of vertigo caused him to consult a neurologist who found no sign of central nervous system disease; there was some nystagmus only in recumbent posture and aural vertigo was suspected and treated. On July 29, 1946, he awakened in the morning unable to speak, his right arm was very weak, and he had left parietal headache.

With this evidence of probable cerebral embolus he was admitted to the Jewish General Hospital for study and treatment of bacterial endocarditis. However, the clinical pattern of body temperature, hæmograms, four negative blood cultures in 17 days, a negative culture of urine, constancy of heart sounds and murmurs, absence of splenic enlargement and of recurrent embolic phenomena made for the decision that he was not suffering from bacterial endocarditis. It was assumed that an embolus from a non-bacterial thrombus in the left auricle had caused the partial hemiplegia which lasted only a few days leaving faint traces such as some numbness of the right side of the face and slight difficulty in articulation.

Date	*Normal*	*Prothrombin time of patient*	*Dicoumarol*
Oct. 8	15 sec.	34 sec.	none
Oct. 11	15 "	22 "	100 mgm.
Oct. 13	15 "	20 "	100 mgm.
Oct. 18	20 "	24 "	200 mgm.
Oct. 22	20 "	28 "	200 mgm.
Oct. 25	25 "	44 "	none
Oct. 29	30 "	57 "	none

About seven weeks after the cerebral embolism, he became acutely ill with evidence of an embolus in the right femoral artery between the inguinal and popliteal regions. He was admitted to the Jewish General Hospital an hour after the earliest symptom, a sense of tiredness of the right leg, had appeared on September 20, 1946. Preparations for embolectomy were complete when he arrived; consultation with the surgeon, Dr. Mark Kaufman, as we observed the effect of a spinal anæsthetic led to the decision that operation should be postponed because he showed signs of probable recovery without embolectomy. Whereas the leg and foot had been blanched and cold, they began to regain normal colour and temperature. He had also received papaverine intravenously. Then dicoumarol was administered so as to maintain the prothrombin time at about double the normal; this was continued during the two weeks of his stay in hospital and maintained after his discharge. The following schedule of prothrombin time estimations and dicoumarol administration was followed during convalescence at home.

During the four days until November 3 he received no dicoumarol, and prothrombin time estimations were not done as he remained in bed at home recovering from what appeared to be mild influenza with occasional chills and fever to 101° on one occasion, October 19, and to 99° on October 30. No clinical or x-ray signs of pulmonary disease could be found.

On November 3, he awoke at 8.00 a.m. feeling nauseated; he went to the bathroom, vomited, and had a loose stool and became very weak, felt he was "passing out", he groaned so that his sister heard him. She found him conscious, but very pale, exhausted, perspiring and pointing to the front of his chest where he said he had pain. At 8.30 a.m., H.N.S. saw him at his home; he looked very ill, pale and perspiring, skin cold, B.P. 50/40; heart sounds at apex, a loud systolic murmur replacing the first sound, no presystolic murmur, normal second sound (Fig. 2); electrocardiogram showed bizarre aberration of QRST complexes suggestive of occlusion of the anterior descending branch of the left coronary artery with infarction of left antero-lateral wall and interventricular septum. During the half hour which elapsed between recording this tracing and developing the film, we thought of ball valve thrombus in left auricle, pulmonary embolism and coronary embolus. This electrocardiogram and another recorded two and a half hours later left little doubt of the existence of extensive infarction of the anterior ventricular wall and interventricular septum. The previous illness and the failure to find evidence of bacterial endocarditis led to the conclusion that a thrombus in the left auricle was the source of the emboli and that this latest embolus had lodged in the anterior descending branch of the left coronary artery very near its origin.

The patient remained in shock. He received adequate sedation and intravenous coramine and aminophylline for severe dyspnœa, which was the most distressing and constant symptom; moist alveolar and bronchial râles appeared in the second hour over both lower lobes and increased in extent and number as cyanosis became more and more intense in spite of his remaining in an oxygen tent. Occasionally he complained of pain in the left subcostal region and in the epigastrium. He perspired profusely from time to time. In the last few hours of life the abdomen was distended and tender; mesenteric arterial emboli were suspected. On one occasion, about three hours after the acute onset, a short superficial murmur which accompanied the first sound was detected and pericarditis was suspected. This murmur was not heard again during subsequent examinations. He died about 19 hours after the onset of this acute illness. Had death been instantaneous the embolus would have been visualized in the mouth of one of the coronary arteries.

The clinical diagnosis recorded before the autopsy was performed was as follows: rheumatic heart disease, button-hole mitral stenosis, slight aortic valve stenosis and insufficiency, left auricular enlargement with thrombus in left auricle, old embolus in right femoral artery, recent embolus in anterior descending branch of left coronary, lodged near its origin with myocardial infarction of left antero-lateral ventricular wall and interventricular septum, passive congestion of liver, pulmonary œdema? pericarditis? recent emboli in branches of mesenteric artery? recent verrucous mitral endocarditis.

The post-mortem examination was made by Dr. M. Simon and Dr. J. Fedder and the summary of their observations is as follows: embolic occlusion of mouth of left coronary ostium with recent myocardial infarction of left ventricle and interventricular septum; massive mural thrombus on anterior mitral valve leaflet; rheumatic pancarditis with mitral stenosis and insufficiency and aortic stenosis; remote and recent infarcts of kidneys; chronic passive hyperæmia of viscera; hydrothorax, bilateral; cardiac hypertrophy; generalized arteriosclerosis, slight; hæmangioma, left cerebral cortex; surgical absence of appendix, accessory spleen.

The main features of the heart were moderate dilatation of right ventricle with hypertrophy of its wall; great dilatation of the left auricle and hypertrophy of its wall, with wrinkled endocardium most pronounced on its posterior wall. The mitral valve, as seen from above, before the valve ring was opened, presented a diaphragm in which there was a patent opening only in its most

lateral portions. The remainder of the slit-like orifice was occluded by an elevated, mottled, firm, red and grey mass, 25 x 18 mm., which seemed to arise from the junction of the anterior and posterior leaflets and to grow up on to the auricular endocardium. As seen from below, the valve opening was oval and measured about 20 x 8 mm. and most of it was occluded by the thrombotic mass. After the calcified valve was cut, it was seen that the thrombus was firmly attached near the point of fusion of the two cusps and lay chiefly over the anterior cusp. Section through the thrombotic mass showed extensive areas of calcification: microscopic examination revealed no bacteria.

Following is a verbatim description of the pathologist's observations with respect to the coronary arteries:

"Upon opening the heart upon the left aspect of the interventricular septum the mouth of the left coronary ostium was accidentally cut tangentially. It was immediately noted that a small, conical shaped mass of tissue of a mottled, red and grey colour measuring 14 x 7 mm. lay loose in the sinus of Valsalva of the left coronary ostium. This conical shaped fragment of tissue is smooth and grossly resembles in some respects the material described on the mitral valve. Microscopic sections of both this material and of the conical fragment show typical thrombus formation in which red and white blood cells are enmeshed in fibrin. In some areas the fibrin has become hyalinized and has undergone focal calcification. Coronary arteries: section through the left anterior descending ramus reveals a vessel in which the lumen is slightly eccentric and an occasional yellow, atheromatous plaque is noted in the wall but the intimal surface is

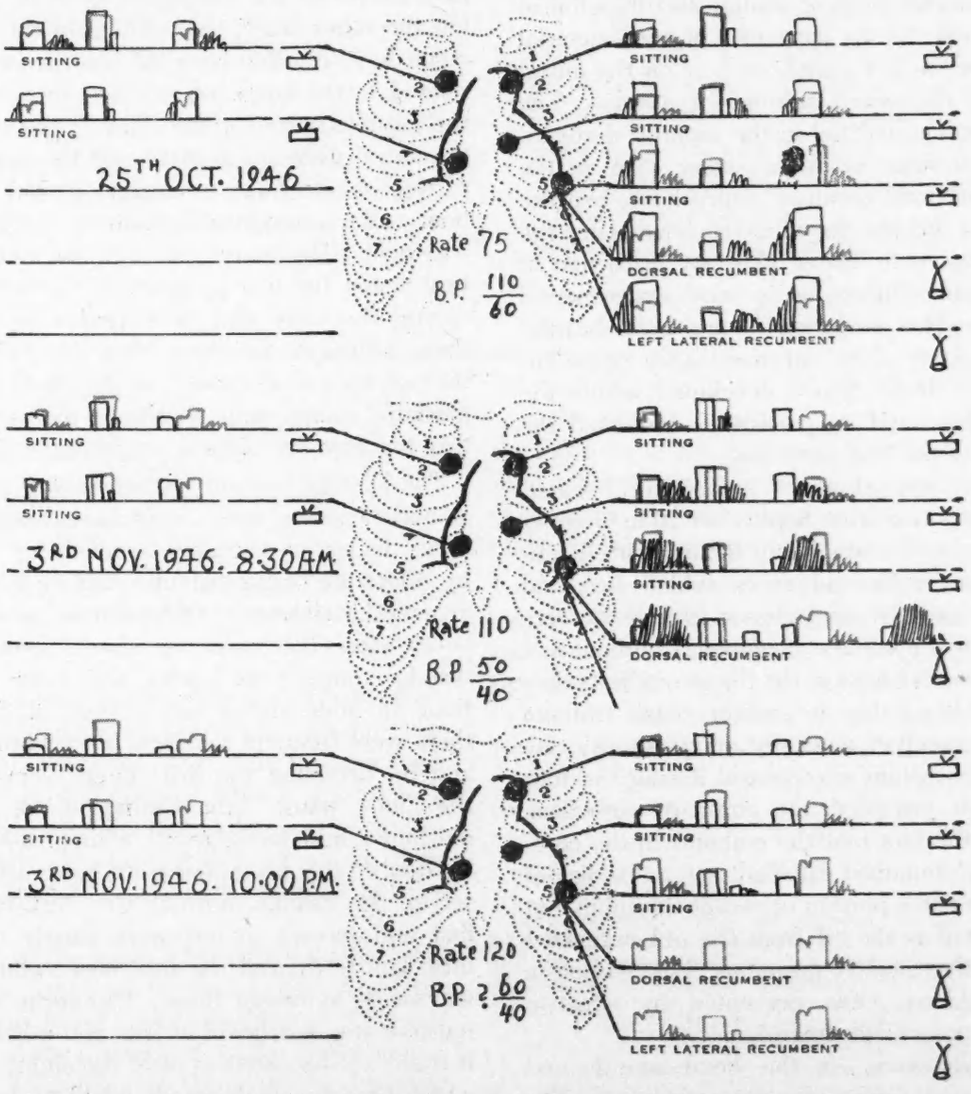


Fig. 2.—The heart sounds and murmurs changed somewhat in the course of the eight years, 1938-1946, as shown in the record of what was heard on October 25, 1946. The aortic systolic murmurs have almost entirely disappeared. There is a "right split" of second sound along both borders of the sternum. The decrescendo-crescendo murmur of mitral stenosis is longer and louder; the crescendo phase is heard in the sitting posture at the apex and over all areas of auscultation except the aortic. These new signs were interpreted as evidence of an increase in degree of mitral stenosis and a change in shape of the aortic valve which resulted in almost total disappearance of the murmurs related to it.

At 8.30 a.m. on November 1946, half an hour after embolism of the left coronary artery a striking change in the sounds and murmurs appeared. The chart of symbols shows disappearance of the mitral diastolic murmur, persistence of a trace of the aortic blowing diastolic murmur at left border of sternum; at the apex the systolic murmur, probably tricuspid, almost entirely masks the faint sound. One premature beat, probably ventricular, is depicted at apex: the long diastolic pause which follows it aided greatly in "timing" the murmur as systolic.

Canad. M. A. J.
April 1954, vol. 70

smooth and glistening throughout. No points of occlusion, thrombi or subintimal hæmorrhages are noted. A similar change and similar conditions are found in the left circumflex branch. Similarly the right coronary arteries fail to show any areas of occlusion, thrombosis or subintimal hæmorrhages."

DISCUSSION

The most acute problem presented by this patient was the differentiation between bacterial endocarditis and non-bacterial thrombi, mural and/or valvular, as the source of the emboli to the brain, lower extremity and coronary artery. Both the bacteriological studies and the clinical evidence led to the diagnosis of non-bacterial thrombi in the left auricle and/or on the mitral valve and this was confirmed at autopsy. The embolus was visualized in the anterior descending branch near its origin rather than in the ostium of the left coronary artery itself, because the patient did live for nineteen hours after the onset of the acute illness. Thus, we learn that in some human subjects, as in some experimental animals, sudden occlusion of one main healthy coronary artery does not necessarily cause instantaneous death. Shock developed within the first half hour and its persistence indicated the likelihood of the fatal outcome.

No detectable signs of embolism appeared during the period from September 20 to October 29, 1946, while he was being treated with dicoumarol. The chills and fever which occurred several times between October 19 and 30 were interpreted as evidence of influenza without any obvious physical signs in the throat or chest: they may have been due to emboli which did not declare themselves clinically or at autopsy. He did not receive any dicoumarol during the four days which preceded the coronary embolism. However, the fact that the embolus in the coronary artery contained calcified material indicates that it was not a portion of recent thrombus but rather that it broke off from the old organized and partially calcified thrombus. This embolism could not have been prevented by effective administration of dicoumarol.

The observations on the heart sounds and murmurs raise some interesting questions. The increase in loudness of the crescendo presystolic phase of the mitral diastolic murmur first appeared in January 1944, the seventh occasion on which a graphic record by symbols was made during the years 1938 to 1944 (Fig. 1). The graphic records at eight subsequent visits of the patient including that of October 25, 1946 (Fig. 2) show persistence of the increased loudness with little if any variation: each of these observations revealed audibility of the presystolic crescendo murmur at the apex and along both borders of the sternum in the sitting posture. That he had occasional upper respiratory infections with fever and frequent rheumatic aches in the limbs during changes in weather during these six years makes it impossible to rule out progressive endocarditis with alteration in shape of the mitral valve as the cause of the change in loudness of the crescendo diastolic murmur. On the other hand, this change in the murmur could have resulted from the obstruction to flow related to the large old calcified thrombus near the slit-like mitral orifice. The disappearance of the mitral diastolic murmur and the appearance of the systolic murmur during "shock" one-half hour after coronary embolism merits some comment. The very low cardiac output per beat made for low pressure in the left auricle during the early and later phases of diastole; thus, although the flow that did take place through the mitral valve from auricle to ventricle probably caused some vibrations, their amplitude was too low for clinical audibility.

The systolic murmur which newly appeared at and near the apex could have been due to some degree of tricuspid insufficiency initiated by dilatation of the valvular ring as a result of myocardial ischæmia. Observations made three hours after the onset of shock revealed the systolic murmur as louder and more blowing than an hour and a half earlier; at this time there were frequent ventricular premature beats and by detecting the first sound element after the "long pause", the timing of the systolic murmur could be achieved without any reason for doubt (Fig. 2). About eight hours after shock set in, the systolic murmur was very faint; the first and second sounds were clearly heard, a little louder than at the final observation which was made at fifteen hours. The aortic diastolic murmur was last heard at four and a half hours, it could not be detected after the eighth hour at which time brachial sounds could no longer be heard and blood pressure was estimated by palpitation as about 60, systolic and 40, diastolic. Thus, if the patient had been attended in his final illness with acute coronary artery disease by physicians who had not previously observed him they would have been denied the opportunity of detecting the clinical signs of the prin-

cipal valvular lesion, mitral stenosis, and at best the murmurs of semilunar valve and auriculoventricular valve insufficiency would have been transient, not clearly indicative of any valvular disease.

In the light of the great progress that has been made in cardiac surgery in recent years, it is permissible to hope that the removal of an embolus from a coronary artery may become possible. In our case, the diagnosis was made within the first hour after the onset; if shock could have been controlled and embolectomy performed the patient's life might have been saved.

SUMMARY

Coronary embolism from a non-bacterial calcified thrombus on the mitral valve in the case of a man of 36 with rheumatic button hole mitral stenosis and slight aortic stenosis and insufficiency is described. The clinical diagnosis, made within the first hour after the onset, was facilitated by knowledge of the clinical course in the previous eight months which included embolism of a femoral and a cerebral artery without positive evidence of bacterial endocarditis. Electrocardiographic evidence indicated the site of the infarct and the approximate position of the embolus. In the light of recent progress in cardiac surgery, it is permissible to hope that embolectomy may become possible in such cases. Interesting changes in the heart sounds and murmurs are described and discussed.

REFERENCES

1. DALEY, R., MATTINGLY, T. W., HOLT, C. L., BLAND, E. F. AND WHITE, P. D.: *Am. Heart J.*, **42**: 566, 1951.
2. GROSS L. AND FRIEDBERG, C. K.: *Arch. Int. Med.*, **58**: 620, 1936.
3. HAMMAN, L.: *Am. Heart J.*, **21**: 41, 1941.
4. JORDAN, R. A., SCHEIFLEY, C. H. AND EDWARDS, J. C.: *Circulation*, **3**: 363, 1951.
5. MORAGUES, V., BAWELL, M. B. AND SHRADER, E. L.: *Circulation*, **2**: 434, 1950.
6. SAPHIR, O.: *Am. Heart J.*, **8**: 312, 1932.
7. SEGALL, H. N.: *Canad. M. A. J.*, **27**: 632, 1932; *Am. Heart J.*, **8**: 533, 1933.

PHRENIC CRUSH AS AN AID IN THE REPAIR OF OMPHALOCŒLES*

DUDLEY E. ROSS, M.D.C.M., F.R.C.S.[C], and HERBERT F. OWEN, M.D.C.M., F.R.C.S.[C], *Montreal*

THE SURGICAL TREATMENT of large omphalocœles, when liver and bowel protrude through the defect in the abdominal wall, may be associated with considerable difficulty. This is due to lack of available space in the abdominal cavity to accommodate the herniated viscera. In such cases, the difficulty may be alleviated by phrenicolysis.

Crushing of the phrenic nerve is a well known and standard surgical procedure that has long been used to bring about paralysis of the ipsilateral leaf of the diaphragm. In the past, phrenic crush has been done for one of two reasons. (1) To put the diaphragm temporarily at rest during the healing stages of surgically repaired traumatic or congenital defects. (2) To reduce the capacity of the ipsilateral hemithorax and so reduce the size of existing pulmonary or pleural cavities, or to bring about certain desired secondary effects on respiratory physiology.

There is, however, another effect of phrenicolysis which has largely been ignored in the past, namely, the resultant increased capacity of the abdominal cavity. In order to demonstrate this effect, and to form some opinion as to whether the magnitude of the increase was appreciable, a series of simple animal experiments was devised.

PROCEDURE

Seven mongrel dogs, all exposed to the ordinary laboratory kennel environment and fed on the routine diet, but varying widely in size, were employed. Under intravenous thiopentone anæsthesia, a No. 12 (F) catheter was introduced into the peritoneal cavity through a small laparotomy wound and the layers of the abdominal wall snugly closed about the catheter to give a water-tight junction. Following this, physiological saline was allowed to run through the catheter under a small head of pressure. The pressure was approximately 30 cm. of saline and was standardized by allowing the saline to flow from a flask suspended so that the fluid level was 30 cm. above the operating table. The level in the flask was not allowed to vary by more than 2 to 3 cm., the flask being refilled frequently to re-establish the original level as fluid flowed into the abdomen. When no more fluid would flow, the amount that the abdominal cavity could contain under these conditions was recorded. A thoracotomy was then done and the right phrenic nerve was crushed just above the diaphragm. This caused

*Presented before the Pædiatric Section at the Annual Meeting of the Canadian Medical Association at Montreal in June, 1951.

From the Department of Experimental Surgery, McGill University, Montreal, and the Department of Surgery, The Children's Memorial Hospital, Montreal.

paralysis of the right leaf of the diaphragm, which was proven radiologically in each case.

Of the seven dogs, one died from generalized peritonitis before any useful result could be obtained. In each of the other six dogs, appreciably more saline could be infused into the peritoneal cavity after the phrenic nerve had been crushed. The increase varied from 12 to 24%, the average being 18% (See Table I).

TABLE I.

EFFECT OF PHRENIC CRUSH ON ABDOMINAL CAPACITY OF DOGS

Dog	*Before crush*	*Interval*	*After crush*	*Increase*
1	2325 c.c.	7 days	2630 c.c.	13%
2	460 c.c.	10 days	570 c.c.	24%
3	995 c.c.	9 days	1190 c.c.	20%
4	895 c.c.	———	Died	———
5	1170 c.c.	11 days	1310 c.c.	12%
6	1140 c.c.	14 days	1380 c.c.	21%
7	785 c.c.	6 days	925 c.c.	18%

A paired-comparisons "t" test shows that the increase in abdominal capacity is statistically significant (P = 0.01—0.001).

The fact that this method of increasing the capacity of the abdominal cavity might prove useful to the surgeon seemed to be demonstrated by a patient treated recently at The Children's Memorial Hospital, Montreal.

A four day old infant, weighing 5 pounds 12 ounces, was admitted in September, 1949 with a large omphalocœle (Figs. 1 and 2). This relatively rare anomaly, which occurs about once in 6,000 live births,[1] masquerades under several other titles, the most commonly used of which are "exomphalos" and "amniotic hernia". The condition is generally held to be due to a retarded growth of the parietes resulting in a cœlomic cavity which is too small to accommodate the mid-gut when it is ready to return from its temporary position in the umbilical cord at the tenth week of fetal life. The extruded organs fail to gain a covering of skin, being covered only by a thin transparent membrane made up of fused amnion and peritoneum. This membrane, due to its relative avascularity, is extremely vulnerable to both infection and trauma.

The appearance of the defect as seen in this patient was quite typical of a large omphalocœle except that the covering membrane was no longer transparent and glistening. As one would expect after four days, it was opaque and covered with purulent exudate. The sac measured 11 cm. in its greatest diameter. In spite of this severe congenital defect, the infant was in good condition. He had, in addition, a harelip and cleft palate but was feeding satisfactorily and evacuating his bowel and bladder normally.

Twelve hours after admission, in his fifth day of life, he was in satisfactory condition for surgery. The sac was excised and found on pathological examination to show "fairly extensive necrosis" of its outer layer. The hernia contained most of the small bowel and all the liver except a small portion of the left lobe. The liver was unusually mobile and had a definite pedicle. It was found impossible to reduce the extruded organs into the abdominal cavity. Using relaxing incisions in each flank, large skin flaps were

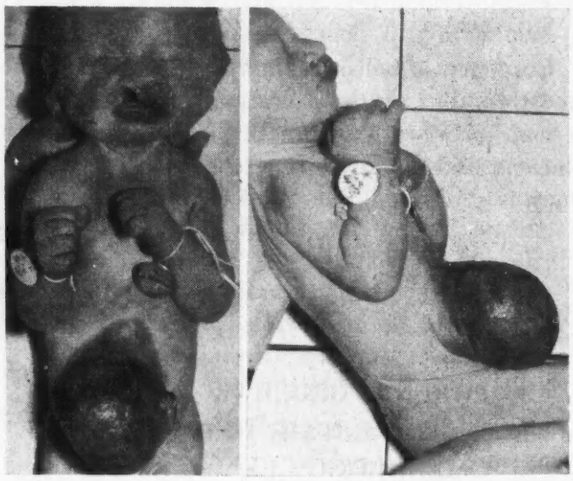


Fig. 1 Fig. 2

Figs. 1 and 2.—Frontal and lateral views at four days of age.

raised and closed over the hernia, leaving fascial and muscular layers widely separated (Fig. 3). This left the infant with a large ventral hernia whose covering was skin and subcutaneous tissue only. Convalescence following this was uneventful and the infant could have been left, with the liver and small bowel lying subcutaneously, until such time as the abdominal cavity had enlarged sufficiently to accommodate them. That would mean waiting 10 to 12 months, throughout which time the infant would be a continual source of worry to parents. In addition, early repair eliminates the difficulty of separating adhesions that would inevitably form to bind the herniated organs in their abnormal positions.

It seemed preferable, therefore, to complete the repair at an early date, if at all possible. This could only be accomplished by increasing the capacity of the abdominal cavity; therefore a right phrenicolysis was undertaken, when the infant was 15 days old. The phrenic nerve was exposed and crushed in the right side of the

neck. Due to the small size of the structures involved, this proved difficult and resulted in failure. The diaphragm was not paralysed. Either the phrenic nerve was not correctly identified, or the patient belongs to that group of individuals who have an accessory phrenic nerve,[2] thus rendering cervical phrenicolysis ineffective. One week later, when the infant was three weeks old, the right phrenic nerve was crushed in the mediastinum, just above the diaphragm. This was

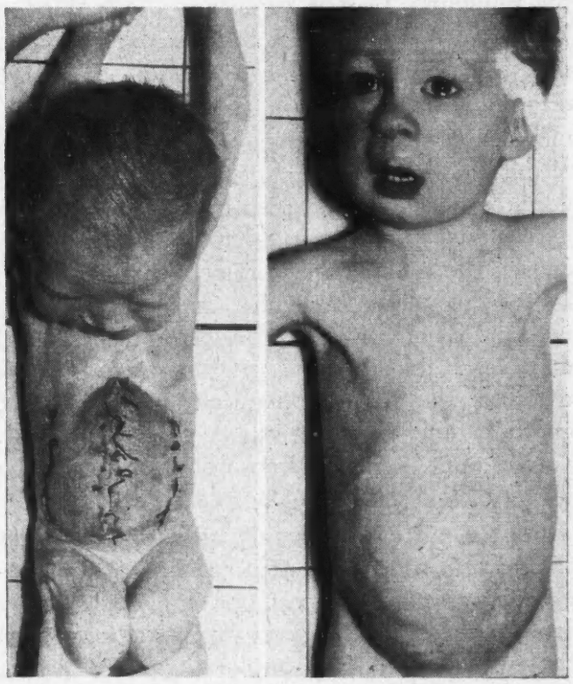


Fig. 3 Fig. 3

Fig. 3.—Frontal view at ten days of age after skin only has been closed over the defect, leaving fascia and muscle layers widely separated. Relaxing incisions are obvious.
Fig. 4.—Frontal view in March, 1951, at one and one-half years of age.

a simple procedure and was accomplished through a small anterior thoracotomy wound in the sixth interspace, involving an operating time of only 20 minutes. A complete paralysis of the right leaf of the diaphragm resulted.

The thoracotomy caused the patient no embarrassment whatever, and one week later, exactly one month after admission, the final repair of the abdominal wall was carried out. The herniated organs could now be reduced with only moderate difficulty and the deep fascia and muscle were drawn together in a single layer to close the abdominal defect. Convalescence was prolonged by a troublesome wound infection, but the deep layers of the repair withstood the infection and no recurrence of the hernia developed. The infant was discharged in November 1949, on his 61st hospital day weighing 6 pounds 12 ounces—just one pound more than on admission.

Since discharge he has developed normally. The hare-lip has been repaired and the defect of his palate is to be corrected at a later date. He was last seen in March 1951, at one and a half years of age (Fig. 4). No defect could then be palpated in his anterior abdominal wall and his abdominal musculature appeared to be normal for his age. Fluoroscopic examination showed the right diaphragm to be riding a little high still, but paradoxical movements were no longer present.

The success attained in this case seems noteworthy when one considers the factors influencing mortality in patients with omphalocœles. O'Leary and Clymer[3] set the mortality at 21.4% of those cases operated upon in the first 12 hours of life, and at 61.6% of those operated upon after 24 hours. These figures demonstrate dramatically the urgency of repair. The surgeon must see the patients at the earliest possible moment if this high mortality is to be decreased. After 12 hours the thin avascular covering of fused amnion and peritoneum becomes, almost inevitably, infected and the risk of rupture and peritonitis becomes imminent.

Ladd and Gross[4] point out other factors that influence mortality: (1) Where part of the liver is contained in the sac, mortality rates up to 75% can be expected. (2) Where the sac measures more than 8 cm., the mortality rate is 85%, whereas when the sac measures less than 8 cm., the rate drops to 25%. The sac in the case presented measured 11 cm.

Mortality is high in the early postoperative period and is often due to respiratory distress and/or interference with venous return, both brought about by the injudicious crowding of abdominal viscera back into the abdominal cavity.

SUMMARY

The capacity of the abdominal cavity can be increased experimentally by phrenicolysis and this procedure may be of use in the repair of certain large omphalocœles.

Phrenicolysis was employed three weeks after birth in one patient with a large omphalocœle and one week subsequent to this operation the liver was easily replaced and the abdominal wall completely repaired without undue tension.

Canad. M. A. J.
April 1954, vol. 70

The authors wish to express their thanks to Dr. F. Clarke Fraser, Director of the Department of Medical Genetics of The Children's Memorial Hospital, who made the statistical calculations on the increased abdominal capacity.

Expenses incurred in the experimental work described in this paper were met in part by a grant from the Molson-McConnell Fellowship Fund.

REFERENCES

1. PEIKOFF, S. S.: *Canad. M. A. J.*, 52: 600, 1945.
2. Gray's Anatomy, 30th ed., p. 1120.
3. O'LEARY AND CLYMER: *Am. J. Surg.*, 52: 38, 1941.
4. LADD, W. E. AND GROSS, R. E.: Abdominal Surgery of Infancy and Childhood, Saunders, London and Philadelphia, p. 322, 1941.

PRE- AND POST-OPERATIVE FACTORS CONCERNING GASTRIC RESECTION FOR DUODENAL ULCER

DEAN MACDONALD, M.D.,
St. Catharines, Ont.

THE COMPLACENCY, even nonchalance, with which the matter of gastrectomy is discussed, by both the laity and physician, is sometimes disturbing. The fact that this operation is still a major surgical procedure seems to be often neglected. Although the mortality in the best teaching centres should not exceed 1 or 2%, a nationwide rate varies between 5 and 15%. These figures are too high. Because they depend upon such things as the choice of and the preparation of the patient, the technical ability and the clinical experience of the surgeon, the team work of the assistant and the anæsthetist, the availability of good postoperative care, etc., much of the mortality and morbidity could be controlled, and therefore, improved. Because of these facts, and because a well planned and a well executed gastrectomy is considered to be the best surgical treatment for many complications of a duodenal ulcer,* and because it is becoming one of the many operations now attempted by the occasional operator, it would not seem out of place to discuss the principles of pre- and postoperative care and to review their application, as seen in the light of our newer acquired knowledge. (The anatomical and physiological aspect of gastrectomy for ulcer or carcinoma of the stomach is an entirely different problem.)

THE DECISION CONCERNING SURGERY (INDICATIONS)

The indications for gastrectomy are quite definite and their serious consideration should reduce the incidence of poorly chosen cases to the minimum. Gastric surgery is much safer in 1953 than it was in 1923, but our thinking does not seem to have advanced in step. Hence we often do not "take advantage of the advantages" offered by surgery, either because of fear and of misunderstanding of the consequences of surgery, or because we expect too much from surgery under the wrong circumstances. For example, the manipulation, dissection, and suturing of the pyloroduodenal tissues may be difficult and dangerous in non-resolved disease, and may lead to disastrous postoperative results, whereas the same operation performed at another time would give an excellent result. Such a fault is in the choosing for surgery. The surgery itself should not be blamed.

For the purpose of therapy all duodenal ulcers should fall into one of two classes—(a) the progressive, or non-resolving, or complicated; these are usually always surgical; (b) the regressive, or the resolving, or the simple: these are nearly always medical. The latter are those patients who have only had a few episodes of pain or whose pain was easily controlled, or those patients who never have had perforation or deep penetration or a hæmorrhage, or maybe only one. These non-complicated patients are those who do not have repeat bouts of trouble for more than a few attacks. With them, ulcer is never a problem. It is never a cause of lost work. However, the patient with a progressive or complicated type of ulcer, resistant to even good therapy given to a co-operative patient, and which so often progresses to perforation or obstruction, or hæmorrhage, nearly always requires surgery at some time, if he (or sometimes she) lives long enough. This is the type of ulcer which will become complicated pathologically, clinically, therapeutically, as well as economically.

All patients become more co-operative and will therefore permit the best results to be ob-

*See report of the Vagotomy Committee of the American Gastroenterological Association.

tained, if a thorough understanding of the total ulcer mechanism and the ulcer problem is given to them. The "complicated" ulcer should be recognized as an entirely different symptom from that presented by the so-called simple or non-progressive type. This former group are well advised to have surgery when the conditions for surgery are optimum, and the time of operation is one of election rather than one of necessity. Whereas prevention is the keynote of all therapy, it is particularly applicable to the surgical treatment of the complicated type of duodenal ulcer.

There are many patients with duodenal ulcer to whom the physician is definitely obligated. These are the patients who cannot make decisions for themselves. Although one should never be too dogmatic there are, nevertheless, certain facts which definitely influence the decision for or against surgery. These facts are briefly as follows: (1) Patients who have a hæmorrhage during treatment or during the recovery period from a previous hæmorrhage, particularly if the ulcer is an old one (which usually occurs in the older age group), need immediate surgery, if good surgery is at hand. (2) All gastric ulcers that bleed should be removed by resection as soon as convenient. (Intestinal bleeding is one of the few instances in which an active effort is not made to stop a vessel bleeding in an active way as soon as possible.) (3) Repeated hæmorrhages are dangerous and the source should be controlled by surgery. Such bleeding usually occurs in the older age group, but it may occur in the young. (The age of the ulcer is of more significance than the age of the patient.) (4) Complications arising in a patient who has already been deemed a necessary candidate for surgery indicate progressive disease. (5) A large emesis from a bleeding duodenal ulcer bespeaks a higher mortality than does bleeding without an emesis. (6) Most posterior wall duodenal ulcers will need surgery sooner or later. They predispose to hæmorrhage, penetrating pathology, pain, and scar tissue obstruction. (7) Surgery is still the treatment of choice for perforated ulcer. (8) Many patients who have had an ulcer for more than five years and who have had recurring bouts of pain, whether or not such pain can be removed by medical treatment, will need surgery to control the course of the probable complications. (Such an ulcer has probably penetrated into adjacent structures.) (9) Those "bleeding ulcers" which do not show a definite and positive improvement within twelve to twenty-four hours, as determined by reliable and acceptable methods, will more likely continue to bleed than stop. (10) Gastric ulcers on one of the curvatures are much more likely to bleed seriously from a large vessel than is a duodenal ulcer. (Ulcers on the greater curvature, are, for practical purposes, always malignant, and so should be removed when discovered.) (11) Pyloric obstruction lasting more than seven days, even if inflammatory in origin, should be relieved by the best means possible, whether or not this is a one or two stage resection.

A localizing x-ray study is always advisable before emergency surgery is carried out, and if done gently with small amounts of barium it should not be a dangerous procedure. This is an important preoperative factor. A reliable x-ray report is of inestimable value to the surgeon and will help him a great deal in his decision concerning surgery. It often is more reliable than gross and manual examination at the operating table.

Thus, the theme of this section is that the physician should not wait until the appearance of complications make surgery imperative before operation is done. Prevention is better than cure, and easier, and safer, and cheaper, and more lasting. The therapist and a complicated ulcer are always racing against time. The best result "under the circumstances" may be bad when the therapist loses.

IMMEDIATE PREOPERATIVE CARE

(a) *The mental aspects.*—The psychogenic factor associated with operation is one of the most potentially dangerous, as well as one of the most neglected, in the entire field of surgery. Certain it is that the thoughts of patients, at both a conscious and unconscious level play, in some instances, a greater rôle in the success of the operation than does the operation itself. This is particularly so when a patient is going to lose such an important organ as the stomach because such patients are often of that nervous and apprehensive disposition which makes them consider in a very doubtful way, their ability to live normally without a stomach. If they were not this type of person they would not have the ulcer. Regardless of what they say, one can count as a certainty the fact that the loss of a

Canad. M. A. J.
April 1954, vol. 70

stomach to such a patient is of much more consequence than it would be to a person who does not have the emotional diathesis necessary to produce a duodenal ulcer. This factor may also be neglected in the consideration of the loss of weight, or the inability to gain weight, following gastric resection. The weight problem in these instances is not the result of structural or absorptive deficiencies. The production of a friendly confidence toward the doctor; a complete understanding of the reasons for surgery; the physiology of the normal and abnormal stomach; the etiology of duodenal ulcer, and the physiology and the function of the stomach remnant, etc., should all be understood in a general way, but in a very practical way, by the patient.

Unconscious preoperative anxieties may be the cause of many postoperative complications. Those on the conscious level can often be handled by the surgeon who should produce a feeling of friendly confidence toward all the patient's "attackers" (surgeon, anæsthetist, nurses). We ask some of our apprehensive patients to enter the hospital two or three days after previous patients have had their operation, so that they may see how well the previous patients have done postoperatively, and so be given encouragement and confidence. This is a very powerful and beneficial preoperative treatment. However, it may boomerang if the latest patient to enter the hospital does not do as well as one of his previous "models". He then compares his considered poor progress to theirs and may so become discouraged. If these patients did not so much need this practical reassurance, they probably would not have had the ulcer in the first place. Also, reassurance against the presence of carcinoma is of the greatest importance. Carcinoma of the stomach is not commonly found in a person who has duodenal ulcer (6%). These discussions with the patient, on a friendly and equal and understandable basis, will reduce the ill-effects of fear and doubt—than which there is no more disastrous personal emotion—whether or not they be associated with surgery.

The pre- and post-operative care should help the patient in more ways than those just necessary for the operation. At this time, he is "given his big chance" to learn, with the help of the surgeon, how to overcome other of life's problems just as he has overcome this, and thus it helps him to better living. This opportunity can be used to help him understand how his fear of other things may have been excessive, and unnecessary, just as was his fear of this successfully accomplished operation. This opportunity should not be missed. The long days and nights in the hospital allow for much thinking on the part of the patient, and give him the opportunity to read and to be talked to, and to ask questions, and above all to talk about himself. Busy physicians say that they have not time for this. But I maintain that this is just as much a part of the surgeon's duty and obligation as is the tying of a secure knot or the associating of the found pathology with the presenting symptoms. The improvement of a physical condition or the bettering of an anatomical relationship is indeed important, but it sometimes is of little value, indeed it may be of no value, without the improvement in the patient's ability to enjoy his new-found health. Everyone knows of many instances in which necessary operations were done with beautiful technique, but in which the patient was not improved after operation. This is sad and can often be prevented by the thoughtful surgeon.

(B) *The physical aspects.*—It is important to know about and to treat those conditions which are not directly associated with the operative condition, but whose presence has much to do with the outcome of the operation. Such as, for example, an irritable bowel; hypertension; cardiac disease; kidney abnormalities in diabetes.

The physical preparation can be well studied from any text book and the current literature, and it will not be repeated here. It is enough to say that the principal factors include the following which are mentioned only in a brief and in a headline way. (a) An evaluation of the blood picture and the consideration of the possible need for transfusion. If the blood of the patient is Rh negative, and there is not much in the bank, the problem of immediate surgery in the presence of a bleeding ulcer is of paramount importance. A patient who is bleeding and who has not had previous blood, and who has never been pregnant, can have Rh positive blood for a period of 48 to 96 hours before the results of the incompatibility show. Therefore the bleeding must have stopped—for sure—within this period of time, and the burden is on the physician to see that cessation of bleeding occurs before this period of relative safety has been lost.

A normal blood count might be the result of concentration, and therefore does not rule out the need for the giving of blood or fluids. It might, in fact, indicate the need for fluids. This is particularly so in those patients with pyloric obstruction and dehydration. In many instances the value of the blood volume determination is of much more importance than a blood count. All blood counts might be normal even though the blood volume is low. (Example—hæmoglobin 79%, actual blood volume 39%.) All patients should have their blood volumes brought to normal before operation if possible, particularly in the older age group. (b) The degree of pyloric obstruction and whether such obstruction is due to œdema from an active ulcer or scar tissue from a dead ulcer. (c) The pre-operative preparation associated with a nutritional deficiency and/or a chemical imbalance. Nutritional deficiencies are often advanced as well as unsuspected in those diseases which advance slowly. This is not uncommon in patients with duodenal ulcer. Acute pyloric stenosis is usually recognized and well treated, but if it is produced by a chronic or a poor symptom-producing ulcer, and poor eating habits, over a period of years, to which the patient has become accustomed, it may be unnoticed and undertreated. The deficiency of protein is especially important in this regard and it is well to remember that protein is saved for metabolism if enough fat and carbohydrate are given, otherwise protein is used up fast. The oral way of absorbing nutrition is the most physiological way, and is therefore the way of choice if possible. However, some of the vitamins might have to be given parenterally. (d) The physical and heart examinations; there may be a differential diagnostic problem between real cardiac angina and myocardial inefficiency produced by repeated subclinical hæmorrhages or oozing from an ulcer, either of which has produced a low oxygen content. (e) Preparation of the patient so that the pyloro-duodenal area will have a minimum of œdema and congestion, thus making manipulation and dissection and suturing easier, and a more radical operation safer. At operation it is well to remember that a healthy person who is ready for a second stage operation is better off than a patient who is still sick from the complications of the first and only stage. (f) The x-ray diagnosis may be more accurate than the manual or gross diagnosis made on the operating table. An exact diagnosis of the primary and secondary pathology should be made as accurately as possible before operation is undertaken. (g) The state of the prostate and of the genito-urinary apparatus is very important in the prevention of postoperative complications. (h) If an unsuspected carcinoma of the stomach is found, or bowel pathology, the preoperative preparation of the bowel will have been important because resection of this part of the intestinal tract might have to be done. (i) A Levine drainage tube should be inserted in all patients before they go to the operating room. (j) In those patients who have recently had barium for their x-ray studies, it is well to empty the bowel before operation so that fecal impaction will not occur postoperatively. No enemas have been used by us before operation for many years because more air may be injected into the bowel than there is material removed. In addition to this, fecal material in the bowel postoperatively produces a normal stimulation to onward peristalsis and therefore there is less chance of gas pains. (k) The skin preparation should be done at least twice the day before going to the operating room, as well as the morning of operation. This consists of gently cleansing the skin with green soap, ether and alcohol.

ANÆSTHESIA

In upper abdominal surgery, it is not too much to say that the anæsthetist may play as important a part in the pre- and post-operative program as does the surgeon. Sometimes he plays a more important part. This should begin the day before operation when he makes the acquaintance of the patient and spends a few minutes with him. The importance of this preoperative friendship, which should do so much to produce confidence, cannot be over-estimated. Allowing the patient to ask any question and receive a satisfactory answer, and to say exactly what he thinks, is better than any preoperative medication that can be bought in a bottle or injected through a syringe. It is real rather than artificial, and lasting rather than temporary. Strange as it may seem, this approach is also the strongest known factor with which to combat pain and fear. This has been well proven by Beecher both in the private and free ward patients, as well as on the Korean front. There is no known factor in life which is as detrimental and as dangerous to the mental and physical integrity

Canad. M. A. J.
April 1954, vol. 70

of a human being as is doubt and fear. This factor can be reduced to a minimum by a competent anæsthetist who likes people and who is willing to spend a few extra minutes with patients. A feeling of thankfulness and gratefulness often outweighs that given to the surgeon—as well it should.

NORMAL POSTOPERATIVE COURSE AND CARE

The postoperative care begins while the patient is still in the operating room. This takes the form of prevention through the medium of a good anæsthetic. Pulmonary complications are most common in the older age group, particularly if they have a long anæsthetic or an operation in the upper abdomen, and if the diaphragm is involved either directly or indirectly. Aspiration into the lungs, of gastric contents, can occur at any age in any operation, as can excessive mucus in the bronchial tree. A capable bronchoscopist is of tremendous help if such an unfortunate incident occurs. If chest complications are foreseen and forestalled by the anæsthetist, or if they are recognized as soon as they appear, much of the morbidity and mortality could be controlled. This is one of the reasons why all patients should be sent to a "recovery-room" postoperatively. An oxygen tent may or may not be necessary or helpful at this time. Oxygen is of particular value in the older age group and in those patients who have been operated upon as an emergency following a severe hæmorrhage. Such people also need blood transfusions postoperatively, whereas patients following operations of election should not need any blood after operation. The amount of blood given postoperatively, even to the patient who was bleeding severely just before operation, should not be more than a few pints if they have been properly prepared. As a general rule those patients who have had emergency surgery for a bleeding ulcer, have more potential postoperative complications than have patients operated upon following a satisfactory preoperative preparatory period, and they require careful and thoughtful, but not apprehensive, attention.

In the recovery room pain is also completely controlled, and here heroin is a drug that is too often forgotten. It is excellent—particularly for just a few days, and the patients should of course, not know what they are getting. (The subjective sensation of pain is conditioned by the attitude of the patient.) A combination of small doses of morphine and heroin is also very beneficial.

Routine exercises postoperatively are the best preventive for chest pathology and the stagnation of blood in the legs, which in turn may prevent pulmonary emboli. These exercises consist chiefly of deep breathing, coughing, leg raising, moving about a good deal, coughing with full support for the wound, etc. There are some surgeons who advocate the stethoscopic examination of the chest three times a day for three days following upper abdominal surgery with the idea of finding the precursor of a serious complication, or even the complication itself before it makes itself known. Others say that such examination would always be positive and so they treat the patient routinely as though chest complications were going to arise. In the older age group, the patients are made to sit on the edge of the bed the night of operation, and to walk around the room either that night or the next day. If well applied sutures will not hold on the day of operation, there is less hope that they will hold 4 to 10 days later. It is thought that if patients do not get up on the first one or two days after operation, they should not get up for seven to ten days, because it is in this interim that an embolus is most likely to break off from a leg thrombus. For practical purposes most of the complications can be prevented by good preoperative preparation and continuous and repeated observation, by both the doctor and the nurse, postoperatively.

Fluids are allowed by mouth the day of operation. If the stomach tube is in the gastric pouch much of the fluid intake acts as a washout for the pouch; another benefit is that fluids keep the mouth moist and clean. Some of the fluid will get into the small bowel and be absorbed. With the stomach tube in place there is little danger of the stomach becoming too distended from drinking, provided that the tube has not become plugged. This should be syringed out as a routine every four to six hours. Although the stomach tube drains a proximal portion of the jejunum and duodenum, it also has openings in it which drain the gastric pouch. The smaller the stoma is, the less is the drainage distally, and therefore the greater is the possible pressure in the gastric pouch, and therefore the greater is the need for the tube. So that whereas the wide Polya resection may not need a gastric tube postoperatively for drainage, the small gastric

opening made according to the general plan of Hofmeister, always demands a nasal tube after operation. After a few days heavier foods such as jelly, milk puddings, egg nogs, milk shakes, etc., are allowed as they are desired by the patient. If these produce nausea or vomiting they are immediately discontinued or given in smaller amounts. But they should not. It is common, at this time, for patients to eat and drink too much. It has been found that such a mild feeding does a great deal to add to the contentment and peace of mind of the patient.

A very accurate record of the intake and output should be kept. This includes the urine as well as the gastric tube output. A urinary outflow of 1,200 to 1,500 c.c. of urine each twenty-four hours should be maintained. In those patients whose preoperative preparation was not sufficient, it is a good thing to add to their minimum intake, at least 1,000 c.c. of protein and carbohydrate solution. A good rule to follow is that all intravenous fluid should be given as glucose and/or protein with distilled water, except an amount equal to the fluids lost extrarenally (tube or drain), and this amount should be given as salt, either as pure saline, or as Ringer's lactate solution, or gastric replacement solution.

Heat to the abdomen is a great benefit in the prevention of gas pains. This is applied next to the skin, and is easy when a minimum of dressing is used. If the abdomen is covered with dressings and pads, not much heat will reach the skin.

Sedation is very important and should not be too much curtailed. Sleep is also very important. Ten to twenty c.c. of paraldehyde by rectum is sometimes a good mild sedative in older people. So is chloral hydrate. If the patient is comfortably sedated the exercises are much more likely to be carried out effectively, than if such exercises produce pain. A patient without pain is also much more co-operative than a patient with pain.

Hiccough may be an important after effect, and it may indicate peritoneal irritation due to something which happened at operation, or it may be due to a leak in the postoperative period. It is to be respected, the cause looked for, and treated vigorously as soon as possible. It should not be allowed to continue.

Although there should be no fæcal impaction if preoperative preparation has been satisfactory, sometimes it may become a most distressing state. If the barium has not been removed before operation, one tablespoon of milk-of-magnesia should be prescribed each morning, noon and evening for several days after operation. This also tends to allay constipation and to prevent gas pains. The drinking of water is also of great benefit. If fæcal impaction does occur, the instillation into the rectum of one to two ounces of 50% hydrogen peroxide for a period of fifteen to thirty minutes, to be followed by the instillation of three to six ounces of warm oil, is very beneficial, and should practically always get rid of the impaction without much pain. In some instances, however, the impaction may first have to be broken up by the finger.

If fever occurs careful attention must be paid to the wound, the kidneys, the legs, and particularly to the chest. Although an intra-peritoneal cause of temperature is not common, it is a most serious one. When fever occurs it is good to remember the three L's—the lungs, the liver and the legs. There are many people who advocate the giving of 200 mgm. of dicoumarol twenty-four or forty-eight hours preoperatively, and 50 mgm. each day postoperatively for four to five days. They believe it will not produce bleeding and that it might be a good preventive procedure. Dicoumarol is, of course, never given postoperatively unless the ulcer has been removed. If a diagnosis of thrombophlebitis or phlebothrombosis has been made a bilateral ligation of the superficial femoral veins should be considered, if intensive and proper medical therapy is not available.

At the end of three or four days most well-prepared patients should be walking around the ward, having discontinued their intravenous therapy, and they should be taking two hourly feedings of soft foods plus their medications. They should, however, stay in the hospital for a minimum of seven to eight days and sometimes as long as ten to fifteen days, depending upon the home conditions to which they will return. Their postoperative exercises should continue long after they leave the hospital and should form a part of their effort to continue in the best general health for life.

COMPLICATIONS (ABNORMAL POSTOPERATIVE COURSE)

This subject is discussed very briefly. Complications can be classed as those which result from:

Canad. M. A. J.
April 1954, vol. 70

1. The poor choice of patient.
2. Poor preoperative preparation.
3. Deficiencies in the technical operation—most of which are controllable (bleeding from an omental tag, leaking anastomosis).
4. Those that result from the general operative procedure (in atelectasis).

THESE CAN ALSO BE CATEGORIZED AS EARLY OR LATE

Early—(immediate)	*Late*
1. Shock - (cardiac).	1. Reactivation of the ulcer.
2. Pulmonary.	2. Stomal ulcer.
3. Leak of the duodenal stump with or without bile peritonitis.	3. Stomal obstruction and/or malfunction.
4. Bleeding.	4. Gastritis with or without well placed stoma.
5. Obstruction of the gastrojejunal stoma.	5. Dumping syndrome (not so common in the Billroth 1 operation).
6. Pancreatitis.	6. Obstruction of jejunum.
7. Sepsis in wound or elsewhere.	7. Retrograde intussusception of jejunum into the stomach (in text book).
8. Wound disruption—with or without infection.	8. Infection (subhepatic abscess).
9. Acute vascular complications. (Venous or arterial).	9. Anæmia.
10. Bile peritonitis from a leaking common bile duct.	10. Malnutrition.
11. Gastro-jejunal anastomosis deficiency.	

Immediate postoperative shock might be hard to recognize when a patient is still under the influence of a general anæsthetic, and it may even be mistaken for cardiac failure. This differentiation is important because venesection may be good treatment for cardiac failure, but it may be bad treatment for hæmorrhagic shock. And, the giving of fluids may be very good for shock but very bad for cardiac failure.

If the temperature is elevated more than one degree for more than 24 to 48 hours after a "clean" operation, careful attention is indicated. If the cause of the temperature is not found at once, it is better not to give any chemotherapy until one knows exactly what one is giving it for, and what it is expected to do. The drainage tube is a too-often-forgotten factor in the production of postoperative temperatures. A jejunostomy tube is usually removed between the tenth and fourteenth day, providing that the method of Witzel has been used. A duodenostomy tube should not come out before fourteen days, but a tube around the duodenum in the periduodenal area can be removed from the seventh to the tenth day.

To repeat, most complications are controllable. For example, if the surgeon expects to perform a gastrectomy, but serious large bowel pathology makes a bowel resection the first problem, this can well be done if the bowel has previously been thoroughly prepared. This preparation should be done as a routine. And again, a gastric carcinoma involving the transverse colon, or a duodenal ulcer producing an active or an inactive fistula in the transverse colon, might be found at operation. Preoperative preparation would permit a wide resection, and it should carry very little added danger. Other complications resulting from poor preparation are concerned with the chest (bad teeth, bronchitis, infected sinuses, etc.), malnourishment (pyloric obstruction) and anæmia (bleeding). Many patients are operated upon too soon after an episode of acute inflammation. This can make a duodenal closure so difficult and dangerous that leaking from such a stump is a distinct probability. Such patients should wait a minimum of eight to ten weeks before surgery is carried out. If for some reason (for example, non-regressive pyloric obstruction) surgery must be carried out before this time interval has elapsed, there are several methods of overcoming the difficulties which are discussed above under "the duodenal stump".

THE "LONG-TERM-LOOK" FOR THE GASTRECTOMY PATIENT

Over 90% of well chosen patients should have a normal and healthy life. The restrictions which apply to them also apply to all those not operated on. Operation does not allow them to live, eat and drink any way they like. Moderation is the "balance wheel" for everyone. The loss of weight which sometimes follows loss of the stomach is not due to anatomical or absorptive deficiencies; it is an emotional problem, or may be normal. The understanding of this is necessary for normal living.

SUMMARY

Gastric resection is still a serious operation, notwithstanding its increased incidence, and one which may have a higher mortality and morbidity than is generally recognized. There is reason to believe that both the laity and the profession look upon this operation with too much nonchalance and too little respect. Because the operation of gastric resection, well considered and well carried out, on a well prepared patient, is the best known treatment for most patients who have the complications of a duodenal ulcer, some of the more fundamental principles concerning the successful pre- and post-operative care are discussed generally and briefly, from a clinical standpoint.

REFERENCES

1. MACDONALD, D.: *Canad. M. A. J.*, **67**: 112, 1952.
2. MACDONALD, D.: *Surgery*, **33**: 394, 1953.

"SOLID" TUBERCULOUS LESIONS OF THE LUNG*

V. D. SCHAFFNER, M.D.,
J. J. QUINLAN, M.D. and
J. E. HILTZ, M.D.,† *Kentville, N.S.*

IN DISCUSSING this type of lesion a clear definition is needed in respect to the intended meaning of the word "solid". In this paper it includes all those lesions, either symptomatic or asymptomatic, that are seen by x-ray to be round or oval, discrete and dense, situated in the lung parenchyma with little or no surrounding infiltration or disease. By such a definition, hilar and mediastinal lesions are excluded as are areas of atelectasis, pleural plaques and caseous disease.

It is not intended to review the literature in an exhaustive manner nor to consider in detail the differential diagnosis, although both are important for a proper concept of the problems involved in handling these lesions. Suffice it to say that the predominant pathological entity will vary greatly according to the geographic location and circumstances under which these lesions are encountered. In a large urban general hospital, most such lesions will be found to be neoplastic, either primary or secondary, while in sanatoria practically all will prove to be tuberculous.

From the University of Chicago Clinics, Thornton, Adams and Bloch[1] reported 23 cases of "circumscribed tumours" of which 14 were primary neoplasms, three were metastatic, one was an hæmangioma, four were tuberculous, and one was a chronic lung abscess. Such findings contrast sharply with our experience. In 76 consecutive cases studied and treated at the Nova Scotia Sanatorium during the past seven years, only one was found to be malignant and that was a secondary carcinoma. Reports elsewhere vary between these two extremes, but it becomes obvious in analyzing them that, for proper evaluation, one must take into account the locality from which they originate and the type of hospital service to which these patients have been admitted, otherwise one may derive false impressions.

The differential diagnosis, in some instances, is easy. When a patient has a definite history of tuberculosis, supported by serial x-rays showing an exudative lesion progressively contracting to a nodule, or a known cavitary area being replaced by a dense round lesion, there is little reason to doubt its tuberculous origin. Areas of calcification within the lesion are indicative, but not absolutely diagnostic, of tuberculosis. Calcification has been known to occur within cancer. Extremely sharp delineation also is more suggestive of tuberculosis but it can be very misleading. The past history, nature of symptoms, bronchoscopic findings, bronchograms, planigraphic studies, sputum examinations—cultures, and Papanicolaou stains—are all important and have to be considered carefully, but at times it is impossible to make an exact preoperative diagnosis and so diagnostic thoracotomy must be undertaken. Even then the exact nature of the disease may be unknown until the pathological report is received. Whether a lesion is stationary or enlarges is of little help in differentiating between tuberculosis and carcinoma. Some carcinomas may not change size or shape for months and may then extend rapidly. Some tuberculous round lesions may also remain static and then progressively increase or decrease in size.

In this presentation it is intended to discuss only tuberculous rounded or solid lesions and the remarks that are to follow pertain specifically to them. Again definition becomes important if we are to understand and treat these lesions logically. Much confusion exists in the literature. In many instances these lesions are all included under the general term of "tuberculoma" provided the diameter reaches some stated dimension of approximately 2 cm. or larger. Culver *et al.*[2] in a recently reported series made the following definition—"A tuberculoma is merely a tumour-like granuloma caused by the tubercle bacillus, encapsulated by connective tissue, and showing no evidence of surrounding inflammation or spread." It is our feeling that such a definition is too broad and in some respects inaccurate. It certainly includes lesions of different genesis and if "encapsulation" means complete walling-off this is not so, as has been shown by Medlar[3] and his co-workers. These lesions may well be classified as three distinct types and there is some practical value in so doing:

1. *Tuberculomas.*—These sometimes represent receding areas of exudative disease ending as partially encapsulated nodules. At other times they appear to arise as blood-borne tuberculous metastases. The size of the nodule is often of

*Presented at the Annual Meeting, Canadian Tuberculosis Association, Montreal, June 3-6, 1953.
†From the Nova Scotia Sanatorium, Kentville, N.S.

little or no practical importance as the smaller ones may be as potent a source of spread and reactivation as the larger ones. The content of the nodule may be fibro-calcific material, caseous, partially liquid or mixed.

2. *Non-discharged cavities.*—These lesions have typical tuberculous fibrous walls with a central area of complete or partial necrosis and have an actual bronchial communication. Their fate appears to depend to a large extent on whether or not the bronchial communication remains open. If it remains open, the contents will be discharged and a true cavity will be seen in its place. If the bronchus becomes occluded, the contents may inspissate or undergo the changes seen in true tuberculomas.

3. *Filled-in cavities.*—These represent lesions which began as true cavities and later, due to bronchial occlusion, filled with liquid or caseous material and later still have even become calcified. Classical descriptions of cavity closure and "healing" by this mechanism have been presented by Coryllos,[4] Loesch[5] and others. Recent investigation would indicate that a less optimistic attitude regarding the "healing" would have been in order. Max Pinner[6] was one of the first to point out the fallacy of such optimism when he stated "Cavities that become blocked by bronchial occlusion may sometimes after long periods of blockage re-open and produce bacilliferous sputum and intrabronchial dissemination." This danger exists with all these solid lesions.

Is it helpful to distinguish each of these types from the others and how can this be done? Actually, in many instances it is not possible to distinguish one type from another and this fact is important from the standpoint of treatment. If first seen in surveys or by single plate observation the x-ray appearance of all these may be identical. If serial x-rays are available, typing can often be readily made. If previous open cavity has existed, this can usually be determined by extremely careful clinical and x-ray evaluation. For reasons that will later be outlined, we feel that it is important to make the distinction if possible.

Until quite recently the appearance of these solid round lesions in the tuberculous patient was often considered good and an indication of final cure. Should such a patient later develop advanced phthisis exogenous reinfection was blamed in many instances. Such a delusion has existed for years and this was well founded, but on a false pathological concept. This concept, simply stated, was that all such round opaque lesions were "closed". By this is meant that they were conceived to be completely surrounded by a thick fibrous protective capsule which prevented the escape of any infective material contained therein and, with the progression of time, the bacilli became "killed off" and the contained material calcified. This is why in the older literature they are referred to as "benign" tuberculous lesions. This concept has now been proven false. These lesions are neither "walled off" nor "closed" as has been shown by the meticulous pathological investigation of Medlar *et al.*, who demonstrated the existence of a direct stem communication with a bronchus. The bacilli contained in the solid lesion, although physiologically altered, are usually not dead and recrudescence does occur in a high percentage of cases causing endogenous and not exogenous reinfection. It is for this reason that such lesions have become a prime indication for excisional therapy.

The results of bacteriological studies of these lesions are still confusing and much has yet to be learned. Medlar *et al.*,[7] Beck *et al.*,[8] and Pagel,[9] working in different centres have shown that practically all have tubercle bacilli in them. These can be seen readily on direct smear but become progressively hard or even impossible to culture as the lesion ages. These non-culturable bacilli may fail to produce disease in the guinea pig. It has also been shown that streptomycin and allied drugs have had nothing to do with this phenomenon in some of these cases, as these drugs had not been administered. These bacilli, however, can cause recrudescence of the lesion and again become pathogenic and culturable. Therefore, in many instances, they are not dead.

Mention was made earlier concerning the importance of attempting to differentiate between tuberculomata, non-discharged cavities and filled-in cavities. The bacilli in the non-discharged cavities are of course active and exhibit all the characteristics of ordinary tubercle bacilli. The bacilli in the filled-in cavities are more indolent and those in the true tuberculomata still more so. It is apparent, therefore, that the urgency of surgery differs where the distinction can be made. What causes recrudescence to occur in these lesions after the so-called healing process has progressed is not known, but the fact that it does so cannot be denied. It

becomes imperative therefore that they be treated and, as the only known treatment at the present time is excisional therapy, this must be applied.

We have operated upon approximately 90 patients with "solid" tuberculous lesions and have taken the first 75 of them as a basis for this analysis. Unfortunately our information is by no means complete, as some forms of investigation, such as the bacterial status of the lesions, have only been undertaken during the past six months.

TABLE I.

AGE AND SEX DISTRIBUTION

Age groups	*Male*	*Female*	*Total*
10 - 19*	3	5	8
20 - 29	16	33	49
30 - 39	5	6	11
40 - 49	5	1	6
50 - 59†	1	0	1
All ages	30	45	75

*Youngest 16 years.
†Oldest 57 years.

Of the 75 patients, 30 were males and 45 females, the majority in the 20 to 29 year age group (Table I). The youngest was 16 and the oldest 57 years of age.

TABLE II.

LOBAR DISTRIBUTION OF LESIONS

Location Right:	*Number*	*Location Left:*	*Number*
Upper	19	Upper	29
Middle	0	Superior segment of lower	5
Superior segment of lower	5	Lower	2
Lower	4	Upper + superior segment	4
Upper + middle	2	Upper + lower	1
Upper + superior segment	3		
Upper + lower	1		
Total: right	34	Total: left	41

The general classification of the disease was minimal in nine, moderately advanced in 60, and far advanced in six, only one having previously had a thoracoplasty performed. In 40 cases the lesion appeared to be solid and in 35 there was x-ray evidence of central rarefaction. In one of the latter group, with multiple lesions, some calcification was seen in the walls of several nodules removed. The size of the nodules varied from less than 1 cm. to over 4 cm., the majority being between 2 and 4 cm.

Thirty-four of the operations were performed on the right and 41 on the left, 48 of them being restricted to the upper lobes alone. The actual lobar distribution of the resected lesions is indicated in Table II. Single "solid" lesions were found 26 times. The lesions were multiple in 49 cases, in only one of which was it not possible to remove all of them. In all but seven of the cases the lesions had remained stable from an x-ray point of view for the six months prior to operation.

TABLE III.

PREOPERATIVE SPUTUM STATUS

Status		*Number*
Positive:	Smear	3
	Concentration	11
	Culture	28
	Gastric washings	3
Negative:	Cultures	30
Total		75

The sputum was positive on direct smear in three cases, on concentration in 11, on culture in 28, and by culture of gastric washings in three. Thirty had negative sputum (see Table III).

TABLE IV.

TYPE OF OPERATION

Operation	*Number*
Lobectomy	46
Lobectomy + segmental resection	5
Lobectomy + wedge resection	2
Lobectomy + segment + wedge	2
Segmentectomy	12
Segmentectomy + wedge resection	2
Wedge resection	6
Total	75

The type of operation selected was lobectomy in 46, and a variety of lobectomy, segmentectomy and wedge or lesionectomy in the remaining 29 (see Table IV).

Postoperatively there were no complications in 63 cases. The remaining 12 had the 27 complications listed in Table V. All of these have now cleared completely except one space which still persists six months following resection, one small empyema space now sterile under a thoracoplasty, and one small empyema space which

required a thoracostomy one year after a segmentectomy. Indeed, it is worth stating that one of the above-mentioned persisting spaces also followed a segmental resection and, in our experience, that this type of operation leads to the greatest difficulty postoperatively in regard to slow re-expansion of the remaining lung tissue. The space was completely obliterated in about two weeks in 66 cases. It obliterated slowly in six and has persisted in the above mentioned three.

TABLE V.

COMPLICATIONS

	Number	*Cleared*	*Persisting*
Spread:			
Homolateral	2	2	0
Contralateral	3	3	0
Fistula—early	8	5	3
Persistent space	6	5	1
Empyema—mild	5	4	1*
" —severe	3	2	1†

*Required operation—decortication and drainage.
†Required thoracoplasty—space still persisting.

There were five mild and three severe empyemas. Of these, one required a decortication, two required a thoracoplasty and one a thoracostomy. Only two still persist, one with thoracoplasty and one with thoracostomy. The prognosis in both these cases appears to be favourable.

At the time of operation the previously recorded x-ray findings were confirmed in 52 cases. However, in 23 cases, additional unsuspected disease was found even though all cases had been studied carefully including planigrams and bronchograms preoperatively. This is of some considerable significance in regard to reactivations of disease or the appearance of so-called "new areas" of disease in cases of tuberculosis generally. It is worthy of note, too, that 42 of the "solid" lesions resected were found to be rather soft on palpation and when sectioned after the operation were found to contain liquid pus.

Microscopic examination of the resected lesions showed 69 of them to be essentially caseous, two fibro-calcific and four fibrocaseous.

Of the 75 cases, 55 had a lobectomy performed, either alone or in combination with removal of a segment or wedge. This afforded us an opportunity to examine carefully 55 major bronchi at the site of section (see Table VI). Unfortunately the resected stump was examined microscopically only during the last year. Nine of the cases had evidence of tuberculous infection of the resected stump; two stumps were grossly infected (not examined microscopically); one had both gross and microscopic evidence of disease; three showed only microscopic evidence of tuberculosis; three had evidence of endobronchial tuberculosis bronchoscopically but were not examined microscopically, although one still had gross evidence of inactive tuberculous tracheobronchitis.

TABLE VI.

STATE OF RESECTED LOBECTOMY STUMPS

	Yes	*No*	*Not stated*
Gross disease	4*	50	1
Microscopic disease	4	25	26
Tracheobronchitis bronchoscopically	3†	50	2

*3 of these not examined microscopically.
†All 3 in "Not Stated" group re microscopic disease and 1 in gross disease group as well.

Strange to say, none of these cases with tuberculosis of the resected stumps contributed the bronchopleural fistulas, persisting spaces or empyemas. One patient did have a homolateral spread of disease and another had a contralateral spread, however.

TABLE VII.

SPUTUM STATUS BEFORE AND AFTER OPERATION

		Number
Negative sputum before operation		30
Positive sputum before operation		45
Converted to negative	25	
Not converted to negative	2*	
Not known yet	18	
	45	

*1—Cause unknown.
†1—Persisting small pleural space and bronchopleural fistula

Table VII supplies information regarding sputum conversions. Culture reports are not available on 18 cases yet. Of the 27 cases who had positive sputum preoperatively and have been fully reported bacteriologically, 25 or 93% have been converted to negative. No cause has been found for the non-conversion in one of the cases whereas the other has been established as due to a small persisting empyema space with bronchopleural fistula.

In this series there were no operative or late deaths.

TABLE VIII.

BACTERIOLOGY OF LESION RESECTED COMPARED TO PREOPERATIVE SPUTUM STATUS

	Number	Negative sputum preoperatively
Bacillary status of lesion		
Smear + culture +	5	3
Smear 0 culture +	2	1
Smear + culture 0	10	6
Smear 0 culture 0	2	1
Not stated	56	

It may be of some interest to present our rather limited findings regarding the bacteriological status of the resected lesions (Table VIII). It has been stated by some authors that these rounded lesions are bacteria-free, by others that bacteria, when present, are dead. In 19 cases, smears and cultures were undertaken from the resected lesion at the time of operation. Eleven of these cases had negative sputum cultures preoperatively. In five cases (three with negative preoperative sputum) both the smear and culture from the resected lesion were positive for tubercle bacilli.

Two cases (one with negative preoperative sputum) yielded a negative direct smear from the lesion but cultures were positive. Ten cases (six with negative preoperative sputum) yielded a positive smear from the lesions but the tubercle bacilli would not grow. In two cases neither the smear nor culture from the lesion yielded positive results although one of these had a positive sputum preoperatively. All these patients received streptomycin and PAS pre- and postoperatively so the presence of these drugs may have influenced somewhat the growth potential of the tubercle bacilli although the ability of the drugs to penetrate such solid lesions is doubted.

DISCUSSION

Rounded solid lesions of the lung may be neoplastic or granulomatous. If tuberculous, they must not be considered to be "closed" lesions. Forty-five or 60% of the cases in this series had sputum positive for tubercle bacilli before operation and an additional 17 cases were shown to have tubercle bacilli retained in the circumscribed lesions. In seven of these 17 cases the bacilli were shown to be capable of multiplication and growth. It is regretted that we were unable to determine virulence by means of guinea pig inoculation.

Tuberculous round lesions are a possible source of reactivation and spread of tuberculous disease. Their treatment is surgical excision, thereby removing sources of future breakdowns and conserving sanatorium beds. The results of such treatment are excellent.

SUMMARY

Seventy-five cases of solid tuberculous lesions treated by resection have been presented.

Surgical resection is strongly recommended wherever possible.

REFERENCES

1. THORNTON, T. F., ADAMS, W. E. AND BLOCH, R. G.: *Surg., Gynec. & Obst.*, **78**: 364, 1944.
2. CULVER, G. J., CONCANNON, J. P. AND MCMANUS, J. E.: *J. Thoracic Surg.*, **20**: 798, 1950.
3. MEDLAR, E. M.: *Am. J. Med.*, **9**: 611, 1950.
4. CORYLLOS, P.: *Am. Rev. Tuberc.*, **33**: 639, 1936.
5. LOESCH, J.: *Am. Rev. Tuberc.*, **50**: 500, 1944.
6. PINNER, M.: *Am. Rev. Tuberc.*, **42**: 731, 1940.
7. MEDLAR, E. M., BERNSTEIN, S. AND STEWARD, D.: *Am. Rev. Tuberc.*, **66**: 36, 1952.
8. BECK, F. AND YEGIAN, D.: *Am. Rev. Tuberc.*, **66**: 44, 1952.
9. PAGEL, W.: *Am. Rev. Tuberc.*, **65**: 673, 1952.

A NEW TYPE OF VIRUS PNEUMONIA IN THE NEWBORN

Between March and May, 1952, there were 17 cases of an epidemic pneumonitis in newborn infants in Sendai, Japan.* The first infant was admitted to the Tohoku University hospital with fever, cyanosis and dyspnœa. Other newborn infants in the nursery began to develop similar symptoms, the first contact infection appearing in 24 hours. Eleven of the 17 infected died, some within 24 hours of the onset of the disease. Jaundice appeared in eight cases, and terminal hæmatemesis in three. As in similar epidemics physical findings were slight in comparison with radiological pulmonary changes. The blood picture was similar to that in suppuration of bacterial origin. An unusual finding was the apparently high resistance of premature infants.

The disease described was considered to be a new entity, because of various points noted above, as well as the absence of inclusion bodies from pharyngeal or lung tissue, the finding of meningitis and serious hepatitis at autopsy, and the lack of response to aureomycin and chloramphenicol.

A virus was isolated from autopsy material by pernasal instillation into mice and culture on fertile eggs. This virus appears to be different from those of mumps, Newcastle disease and influenza. Electron microscopy showed that it was a spherical particle 150-200 mμ in size.

*T. Sano, *et al.*, *Yokohama Med. Bull.*, 4: 199, 1953.

Canad. M. A. J.
April 1954, vol. 70

CEREBRAL ANGIOGRAPHY IN INTRACRANIAL HÆMORRHAGE*

M. K. KIERNAN, M.D.,† *Winnipeg*

THE PURPOSE of this paper is to review the development of cerebral angiography and to illustrate the value of this radiological method of examination in suspected intra-cranial bleeding.

The first published methods of technique were presented by a Portuguese physician, Egas Moniz,[1, 2] reporting in 1927. Numerous studies of this procedure were made on the European Continent where its development was rapid and its use became common. In the U.S.A., England and Canada, cerebral angiography was not taken up to any extent until comparatively recently because of the severe side-effects of the early contrast media which were sodium iodide at first, and later, thorotrast. In 1939, 1940, and 1941 Gross[3, 4, 5] first reported the use of 35% Diodrast as a satisfactory contrast medium, with much rarer and less grievous side reactions. Careful experimental work indicated that Diodrast in this concentration produced no significant or permanent damage to cerebral vessels.

In the past few years, cerebral angiography has developed rapidly and is now used frequently in larger hospital x-ray departments. Much of the credit for its popularization is due to the employment of Diodrast and the development of the percutaneous technique of introduction into the internal carotid and vertebral vessels.

A large number of articles have appeared in medical literature in the past 4 or 5 years dealing with this method of examination, and it is apparent that the consensus in many countries establishes the fact that this procedure is a safe and effective diagnostic method, when performed with reasonable precautions. Cerebral pneumography is a radiological method which is indispensable to neuro-surgeons today, and angiography is becoming as important. In many instances of increased intracranial pressure, it is less dangerous than air studies and is usually less distressing to the patient.

There are contraindications to its use, although these are few, and must be weighed against the information which may be obtained. The principal, and possibly absolute, contra-indications are serious renal damage, severe hypertension, and important allergic history and all these are related to the contrast medium in use at present.

Complications can and do occur, although these can be reduced and minimized. Intracranial effects are due chiefly to excess trauma to the vessel injected; air or clot embolism; and direct stimulation to artery by the contrast medium, producing spasm. It cannot be too strongly stressed that Diodrast must not be used in concentrations stronger than 35%, or in quantities over 40 ml. on one side in one day. There does not appear to be any real reason for hesitation or delay in the use of this procedure immediately following the onset of any type of intracranial bleeding. Extracranial complications are related to hæmorrhage from the puncture, extravasation of contrast medium, and needle trauma to nerves and ganglia adjacent to the artery.

The surgical technique employed in our hospital will be discussed only briefly. The percutaneous method of arterial puncture is always used, except where the puncture fails or where there is some special indication for surgical exposure such as a proposed carotid ligation. The technique used by our neurologists and neurosurgeons varies individually to some degree, although their methods follow fairly closely that described by Lindgren in 1947. Premedication is used, tailored to the requirements of the subject. A co-operative patient is highly desirable, but where co-operation is lacking or mental derangement is present, Pentothal anæsthesia will be required. Local anæsthesia is used extending down from the skin along a needle track to the carotid vessel, whose sheath is well infiltrated. An 18 gauge needle is used for the arterial puncture connected by a glass connector to a short length of pressure tubing, in turn attached to a two-way syringe adaptor. When the needle is in position in the vessel, saline-glucose solution is slowly injected to prevent clotting in the needle. Diodrast is injected rapidly, uniformly and smoothly at a rate of 5 ml. per second, followed by the glucose-saline solution again.

The radiographic technique employed here is in no way unique, although the cassette-changer was designed and manufactured locally by Mr. Earl Carlyle of the Picker X-Ray Corporation to

---

*Read at the 86th Annual Meeting in Winnipeg, June, 1953.

†Assistant Radiologist, Winnipeg General Hospital and The Children's Hospital, Winnipeg, Man.

specifications devised by Dr. Arthur E. Childe, one of my senior associates.

A fine focus rotating anode tube is employed at 300 ma., 76 to 78 KvP., 3/10th second exposure, at a distance of 48 inches for the anteroposterior examination. For the lateral views, 200 ma., 66 to 70 KvP., 1/10th second exposure at 27 inches is used. An extended enclosed metal oblong cone 14½ inches long reduces secondary radiation, and limits the x-ray beam to the cassette area. In the anteroposterior view, the table Bucky is used, but in the lateral views a 60 line Lysholm stationary grid is employed.

The cassette-changer is placed on the table top and the patient's head is carefully positioned to obtain an anteroposterior view with a perpendicular central ray passing through the orbito-meatal line. This requires head flexion, and we use a balsa wood doughnut to elevate and retain the occiput. It is essential that there be no rotation or lateral flexion of the head. The lateral views are obtained, maintaining the patient in this same position, by swinging the tube-head around to employ the central ray horizontally passing through the pituitary fossa or in the plane of both orbital plates. In instances where the vertebral artery is injected, a different anteroposterior view in a submento-vertical plane can be used to display the basilar and posterior cerebellar arteries to better advantage. Test films are taken in the views required to determine an ideal exposure for each. These are processed and inspected before puncture is made and before the examination is begun.

Diodrast is injected by the neurosurgeon or neurologist in the manner described previously, who indicates when the first x-ray exposure is to be made. This is generally when the syringe is almost emptied of its 10 to 15 ml. of 35% Diodrast, and the tubing is still partially ballooned out. For the lateral views, we prefer exposures made immediately, at ¾ second, at 1½, and 2¼ seconds, but occasionally using times of zero and 1, 2, and 3 seconds. After a short interval the injection is repeated and another series of 4 films obtained after shifting the tube-head to obtain stereoscopic views. The tube-head is again shifted for vertical use, and following a third injection of 10 to 12 ml., a single A.P. view is taken.

In the anteroposterior view, the contralateral carotid can be occluded by digital pressure. In this way, the anterior and middle cerebral arteries will be visualized on both sides. At the Winnipeg General Hospital, we feel that stereoscopic studies give a better impression of the spatial distribution of the visualized vessels and also the second injection occasionally fills segments which are not outlined in the first injection.

The lateral views, obtained at the time intervals mentioned, show a well filled arterial system in the first film, and good capillary filling in the second and to some extend in the third film. The third film also shows the deep cerebral veins and superficial anterior veins. The fourth film shows a fairly complete phlebogram with filling of some of the dural sinuses. It must be remembered that there may be numerous variations in the course and distribution of cerebral vessels. The limits of normal cerebrovascular anatomy must be known so that erroneous impressions are not obtained from angiographic studies.

Intracranial hæmorrhage can be subdivided simply into traumatic and spontaneous varieties. Cerebral angiography can play an essential role in determining the cause and location of such bleeding and should indicate whether the underlying lesion is amenable or not to surgery. In instances where segments of cerebral circulation may have to be sacrificed, it can indicate whether there is ample collateral circulation to justify such a procedure.

In the traumatic group, massive intracranial bleeding is difficult to assess and diagnose in the seriously injured patient. It is possible to differentiate by angiography subdural, epidural, and intracerebral hæmatomas and to recognize their not infrequent co-existence. The presence and location of hæmatomas is suggested by spatial deformities of anterior and middle cerebral arteries, occasionally by the displacement of their finer radicles away from the cranium. In the diffusely damaged brain, the cerebral vessels do not show significant displacement and unnecessary explorations may be avoided.

In spontaneous intracranial bleeding the more common causal agent is a ruptured aneurysm, although arterio-venous malformations, angiomas, mycotic emboli, blood dyscrasias, and fragility of blood vessels as found in hypertension and brain tumour, can also be the cause of bleeding. The clinical examination in these conditions is not reliable and the smaller organic lesions will not often have localizing signs.

Canad. M. A. J.
April 1954, vol. 70

In most reported studies of intracranial aneurysms where well conducted angiographic examinations have been done, there is a negative error of approximately 5% in failure to demonstrate the lesion. Reported causes of failure to fill the aneurysm with the opaque medium are filling of the sac with clot or obstruction of an anastomotic vessel bearing the aneurysm. There are also hæmodynamic factors which can preclude demonstration of the lesion, where local vascular spasm may divert the Diodrast laden blood stream to vessels of larger calibre and lower pressure gradients.

Arterio-venous malformations are generally shown well, and angiomatous structures are demonstrated, whether primary or associated with neoplasm of nervous tissue. Where intracranial aneurysms are being sought or excluded, it is important to obtain bilateral angiographic studies, especially in cases without localizing signs. The posterior cerebral arteries, filled by vertebral artery injection, must also be studied where carotid contrast injection fails to demonstrate an aneurysm. The not infrequent occurrence of multiple aneurysms is another factor to be remembered in planning a complete examination. It is generally accepted that there is no added risk of precipitating further bleeding even during the acute episode.

It is important to state that the neurosurgeon will obtain essential information of the state of the collateral circulation and patency of the circle of Willis. Normally the intracranial vessels on the side opposite to the injection are seen only after compression of the internal carotid artery of that side. Bilateral filling occurs by way of the communicating arteries. The medium may even descend into the opposite internal carotid artery and occasionally will also descend into the basilar artery. The information on collateral circulation will enable the neurosurgeon to determine which vessel segments may be sacrificed without causing permanent invalidism.

Cerebral angiography can dispel much of the uncertainty in the diagnosis and prognosis when spontaneous subarachnoid hæmorrhage occurs, and it is difficult if not impossible to obtain the anatomical and physiological information in any other way. The term of "anatomy *in vivo*"[6] has been very aptly applied to this diagnostic method. The facilities for adequate studies of this type are not too complicated or too expensive to add to a well equipped larger general hospital department.

Interpretation of cerebral angiograms is still far from perfect, but increased personal experience will yield greater precision. The search for a more ideal contrast medium will continue and eventually other compounds will be developed which will reduce the side effects and limitations of material now in use. There cannot be any doubt that cerebral angiography will be used more widely, and that further chemical and technical improvements will be developed to add increased value to this near indispensable diagnostic method.

REFERENCES

1. EGAS MONIZ: *Rev. Neurol.*, **2**: 72, 1927.
2. EGAS MONIZ, PINTO, A. AND ALMEIDA, L.: *Rev. Neurol.*, **1**: 489, 1929.
3. GROSS, S. W.: *Proc. Soc. Exp. Biol. N.Y.*, **42**: 258, 1939.
4. *Idem*: *Arch. Neurol. & Psychiat.*, **44**: 217, 1940.
5. *Idem*: *Radiology*, **37**: 487, 1941.
6. BASSETT, R. C., LIST, C. F. AND LEMMEN, L. J.: *Surg., Gynec. & Obst.*, **95**: 701, 1952.

TEN COMMANDMENTS

Try adapting this to your organization; substitute *ordinary member* for *customer*, your *organization* for *business;* or if you are a government employee, try *ordinary citizen, nation, province, municipality.*

MEDICAL NOTE: Try *Patient* and *Practice.*

1. A customer is the most important person in any business.

2. A customer is not dependent upon us—we are dependent upon him.

3. A customer is not an interruption of our work—he is the purpose of it.

4. A customer does us a favour when he calls—we are not doing him a favour by serving him.

5. A customer is part of our business—not an outsider.

6. A customer is not a cold statistic—he is a flesh and blood human.

7. A customer is not someone to argue or match wits with.

8. A customer is one who brings us his wants—it is our job to fill those wants.

9. A customer is deserving of the most courteous and attentive treatment we can give him.

10. A customer is the life blood of this and every other business.

Canad. M. A. J.
April 1954, vol. 70

Case Reports

INTRAEPITHELIAL CARCINOMA OF THE LARYNX*

ERNEST E. SCHARFE, M.D.,
T. MUNCEY TANTON, M.D. and
W. H. MATHEWS, M.D., *Montreal*

INTRAEPITHELIAL CARCINOMA, carcinoma *in situ*, and preinvasive carcinoma are terms used to describe an early type of carcinoma which shows essentially the same cellular characteristics as ordinary carcinoma. The chief distinguishing feature is its peculiar spread within the epithelium instead of infiltrating the underlying stroma. Broders[1] in 1932 used the term "carcinoma *in situ*" and emphasized the fact that a tumour should not be considered nonmalignant because it has not penetrated the basement membrane. He stated "The diagnosis of carcinoma *in situ*, as of any carcinoma in general, is based chiefly on altered cellular characteristics in contradistinction to cellular situation."

The chief microscopic feature of this carcinoma, in any location, consists of a replacement of the normal epithelium of the surface, with or without involvement of related glands and gland ducts, by an atypical type of epithelium. This change may affect the full thickness of the epithelium, or only its deeper layers. The cytologic features are: (1) a disorderly cell arrangement with loss of normal cell polarity; (2) cellular crowding with nuclear overlapping; (3) nuclear enlargement and hyperchromasia with abnormal amounts and arrangement of the chromatin; (4) variations in nuclear size and shape, and (5) unusual frequency of mitotic figures, some of which may be of abnormal form.

Diagnosis of intraepithelial carcinoma presents many difficulties both clinically and microscopically. It may be difficult to distinguish between intraepithelial tumour and chronic laryngitis which may precede or accompany it. The microscopic diagnosis of early intraepithelial changes is not always easy. Involvement of glandular ducts can be mistaken for infiltrating tumour. Specimens taken from one part of the lesion may show intraepithelial cancer and from another part invasive cancer. Some of the above problems may be solved by taking not only one biopsy but if necessary several.

Several questions arise when one is confronted with a case of intraepithelial cancer. Is it actually malignant or is it a precancerous condition? Will it become invasive and, if so, how soon? The most important question is, however, should it be treated differently from the invasive type of cancer? Cytological studies carried out by Papanicolaou as early as 1917 have done much to stimulate interest in the characteristics of the malignant cell. Further studies by this scientist,[2, 3, 4] McCarty[5] and many others have made the early recognition of cancer possible in many cases. It has also resulted in the recognition of intraepithelial cancer as a clinical entity.

Although this type of tumour has been recognized as occurring in the skin under the name of Bowen's disease for many years, it has only been diagnosed in the larynx and other parts of the respiratory tract more recently. Brighton and Altmann[6] in 1942 reported three cases of vocal cord tumours which they diagnosed as superficial squamous cell epithelioma akin to Bowen's disease.

Clerf[7] in 1944 reported an unusual case of cancer of the larynx. In this case a diagnosis of cancer of the larynx was made in 1927. The patient refused operation and continued his work for eleven years. Further examination at this time, namely eleven years later, revealed an extensive carcinoma which was still, however, operable. Laryngectomy was performed and the patient was still well 5½ years later. Further review of the original biopsy material suggested that this might have been originally an intraepithelial cancer.

Snitman[8] in 1945 reported a case of carcinoma *in situ* of the right vocal cord. In this case, the left vocal cord and one-half cm. of the right vocal cord had been previously removed by laryngofissure. Several subsequent sections revealed incomplete removal of the carcinoma *in situ* of the right cord.

Brunner[9] in 1950 reported a case of so-called superficial epidermoid carcinoma of the larynx. In this case, a small white mass developed subglottically about two months after laryngofissure. Biopsy of this showed superficial epidermoid carcinoma and laryngectomy was performed. No carcinoma was found in the postoperative specimen. Brunner states:

"Superficial carcinoma of the larynx may be an actual carcinoma microscopically. It is not a genuine carcinoma from the therapeutic point of view." He further states "The carcinoma *in situ* may be removed by the endo-

*Presented at the Seventh Annual Meeting of the Canadian Otolaryngological Society, Minaki Lodge, Ont., June 17, 1953.
From the Departments of Otolaryngology and Pathology, Montreal General Hospital.

laryngeal route if it forms a localized tumour, and further steps may be taken if this procedure does not prove to be effective."

Gordon[10] in 1950 reported a case of "Keratosis of the larynx with underlying carcinoma *in situ*". Votaw[11] in 1952 presented an excellent review of "Carcinoma *in Situ* in Otolaryngology". He reported four cases of carcinoma *in situ* of the larynx and one case in the glossoepiglottic fold. Three of the laryngeal cases were treated by laryngofissure. In the fourth case, carcinoma *in situ* was found in what appeared to be two typical laryngeal nodules. This patient has had no treatment other than the endolaryngeal removal of the nodules but she is kept under regular observation.

Altmann, Ginsberg and Stout[12] in 1952 presented a larger series of cases. They reviewed 312 cases of laryngeal epithelioma over a ten year period 1940-1950. Fifty-seven of these showed intraepithelial changes warranting the diagnosis of intraepithelial epithelioma. Nine of these were cases of recurrent papillomata in which there was some doubt regarding the diagnosis. Nineteen of the remaining 48 cases showed some degree of infiltrative growth. The remaining 29 cases or 9.3% of the total number of laryngeal cases showed only intraepithelial cancerous changes. In 27 cases the lesion was intrinsic, and in two cases it was extrinsic. Twenty-seven of the 29 cases were followed up after treatment.

Summary of treatment and results.

Biopsy only—4 (3 alive and well).
Laryngofissure—11 (10 alive and well).
Laryngectomy—2 (1 alive and well).
Radiotherapy—10 (5 alive and well).

Only one death, however, was directly due to cancer. In only one case did the operative specimen show infiltrative growth but in seven cases at operation, the lesion was found to be much more extensive than was suspected clinically. These authors conclude:

"In view of the lesser degree of malignancy of cancer *in situ* the treatment can be more conservative than in infiltrating cancer. Radiotherapy has evidently a better chance for success than in extensively infiltrating cancer, and should be seriously considered, particularly in those cases in which laryngectomy is the only alternative."

Since 1947 in the Department of Otolaryngology of the Montreal General Hospital the diagnosis of intraepithelial carcinoma of the larynx has been made in the following four cases.

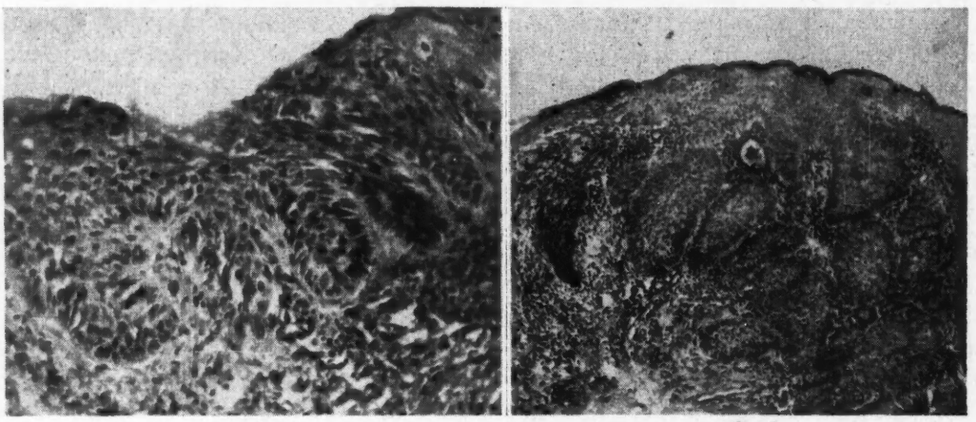


Fig. 1 Fig. 2

Fig. 1. (Case 2).—Irregular neoplastic thickening of the mucosal epithelium with cytological features of carcinoma but lacking in invasive character. **Fig. 2.** (Case 2).—The surface epithelium is carcinomatous and from it there is downgrowth into the mucosa tunica propria with an invasive character present.

CASE 1

This case was reported in 1952 as a case of keratosis laryngis which developed intraepithelial carcinoma and also invasive carcinoma.[13]

CASE 2

A 69-year old male was admitted to the Montreal General Hospital on August 13, 1947, complaining of hoarseness for the past ten years. This had suddenly become worse in the past three months. Past history was not contributory. Physical examination showed a well developed, well nourished male. Blood pressure was 130/76. Blood Wassermann was four plus and cerebro-spinal fluid Wassermann was weakly positive. Chest x-rays were negative. Electrocardiogram showed "a possible old posterior focal lesion".

Laryngoscopy showed moderate hypertrophy of both vocal cords. The middle third of the left vocal cord showed marked heaping up of the tissues, the surface of this area being irregular and covered with a white exudate. Biopsy from the left vocal cord was reported as showing intraepithelial and possibly early invasive epidermoid carcinoma.

The patient at first refused any form of treatment to his larynx, and anti-syphilitic treatment was started. On September 18, 1947, several biopsies were taken from the right vocal cord. One of these biopsies showed intra-

epithelial carcinoma. On October 4, biopsy from the right cord was repeated and no tumour was found. Patient was readmitted in November, 1947. Direct laryngoscopy showed a flat irregular ulcerated area on the left vocal cord and a polypoidal growth on the anterior third of the right cord. Biopsies were taken from both cords. These showed non-suppurative inflammation of the right and left true vocal cords with intraepithelial carcinoma of the left cord and epidermization of the right. At this time, all the previous sections were reviewed. The first and last biopsy from the left cord showed an epidermoid type of carcinoma, focal and intraepithelial in the first but more diffuse and probably superficially invasive in the last. One biopsy from the right vocal cord showed intraepithelial carcinoma on one occasion. This was not confirmed on subsequent biopsies.

The patient persisted in his refusal to have any operative interference but eventually consented to have x-ray therapy. He received a tumour dose of 4,500 "r". On his last visit to the Out-patient Department in March, 1948, it was noted that the laryngeal airway was quite narrow. He refused further treatment and follow-up through his family physician revealed that he died of laryngeal obstruction in 1952.

Figs. 1 and 2 show the microscopic pathology.

Comment.—This is apparently a case of intraepithelial carcinoma which went on to invasion. The picture was complicated by the possibility of luetic laryngitis. We realize that the treatment was inadequate but this was largely due to lack of co-operation on the part of the patient.

CASE 3

A 71-year old male was admitted to the Montreal General Hospital on December 27, 1951, with the complaint of hoarseness of two months' duration. Laryngeal biopsy was taken at the Jewish General Hospital the week before, and the report from there states that "The histological diagnosis was intraepithelial carcinoma (non-invasive) of the larynx". The report further stated that "The man's left vocal cord had been previously biopsied on September 15, 1949, at which time no pathological diagnosis could be made, but the possibility of a papilloma was considered." Past history revealed that he had had intermittent attacks of hoarseness "for years", but was otherwise not contributory.

Physical examination revealed a well nourished white male. There was a Grade II apical systolic murmur. Blood pressure was 180/80. Electrocardiogram was "suggestive of right ventricular changes". Kline was negative. Urine was clear. Chest x-ray was negative.

Direct laryngoscopy showed normal movement of both cords and a small irregular growth on the left true cord at the junction of the middle and posterior third. This area and also the surrounding tissue was removed endoscopically. Section of this tissue and further biopsies taken three days later did not reveal any evidence of malignancy.

Neither the patient nor his family would agree to further surgical treatment. It was considered that the focus of malignancy had probably been removed endoscopically but as an added precaution he was given a course of deep x-ray therapy. The tumour dose was 5,900 "r". This patient is still alive and well with no evidence of recurrence.

Comment.—Regardless of the subsequent negative biopsies we believe that the treatment of choice in this patient would have been laryngofissure and removal of the involved vocal cord. This procedure is, we think, less disturbing to the patient and offers a better chance of cure in this type of lesion than does x-ray therapy.

CASE 4

A 54-year old male was admitted to the Montreal General Hospital on September 28, 1952, with the history of having suddenly become hoarse two months prior to admission. He consulted an otolaryngologist in his own city where biopsies were taken from each cord. Biopsy from the right cord showed carcinoma and he was referred to the Montreal General Hospital for treatment. Past history revealed that he had had a nephrectomy (right) in 1938.

The blood pressure was 140/76. Hæmogram was normal with a hæmoglobin of 14.3 gm. Kline (blood) was negative. X-ray of chest was clear. Urine was clear.

Direct laryngoscopy under Pentothal and local anæsthesia showed a little irregularity of each cord just anterior to the vocal process. This irregularity was slightly more pronounced on the right cord. Several

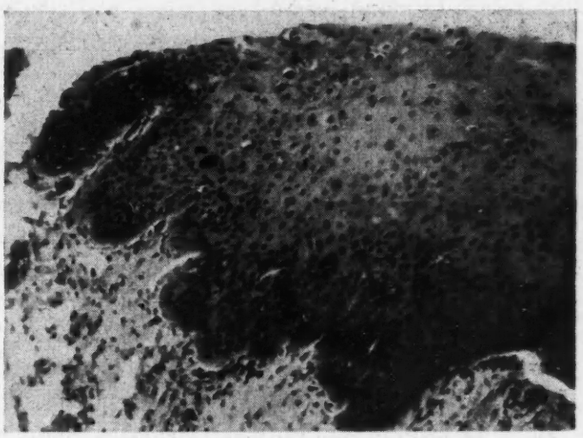


Fig. 3. (Case 4).—Localized intraepithelial carcinoma of the right true cord.

biopsies taken from these areas on two different occasions showed only scarring and mild non-specific inflammation of the right vocal cord. However, the slides from the biopsies taken prior to his admission were reviewed. Those from the left cord showed a minute simple epithelial polyp but those from the right cord, however, showed a thickened keratotic atypical squamous epithelium with morphological features of an intraepithelial carcinoma. No infiltrating cancer was seen.

On October 6, 1952, tracheotomy and laryngofissure was performed. The right true and false cord, approximately one-third of the right arytenoid and about ½ cm. of the anterior part of the left true cord were removed. The patient was able to swallow fluids and soft diet on the first postoperative day and on the second day the tracheotomy tube was removed. Convalescence was uneventful and he was discharged on October 19, 1952.

Fig. 3 which is taken from pathological sections of the removed tissue, shows that in one area of the right true cord the lining epithelium is seen to become markedly acanthotic and the rete pegs are elongated. The prickle cells here have lost their polarity, many of them being atypical with large vesicular nuclei having one or more prominent nucleoli. Intraepithelial pearls and individual cell keratinization is a feature. Many of the cells are vacuolated. Mitotic figures are present but not abundant. The basement membrane is intact throughout and there is no frank invasion of the tunica propria which is infiltrated with lymphocytes beneath the lesion.

Comment.—Further intraepithelial carcinoma was found in the postoperative specimen al-

Canad. M. A. J.
April 1954, vol. 70

though it was found in only the first of several preoperative biopsies. More extensive endoscopic removal of the involved area might have been adequate in this case. We believe, however, that in view of the location of this tumour (*i.e.* near the junction of the middle and posterior thirds) the more radical excision was justified.

SUMMARY AND CONCLUSIONS

Intraepithelial carcinoma is microscopically an actual carcinoma and should be treated as such. It does, apparently, eventually become invasive. The period of time between intraepithelial carcinomatous changes and invasion is a very variable factor. This is illustrated by reported cases in which a long period of time supervenes between diagnosis and ultimate successful treatment.

The question as to whether this type of carcinoma should be treated differently from invasive carcinoma is apparently still controversial. Our personal experience with this type of tumour is still too limited to allow us to make positive statements as to the proper treatment. If we may be permitted, however, to draw conclusions from these four cases, the treatment of intraepithelial carcinoma should not vary greatly from that of the invasive type. With a few exceptions the same indications for surgical removal should be observed.

REFERENCES

1. BRODERS, A. C.: *J. A. M. A.*, **99**: 1670, 1932.
2. PAPANICOLAOU, G. N. AND MARSHALL, V. F.: *Science*, **101**: 519, 1945.
3. PAPANICOLAOU, G. N.: *J. A. M. A.*, **131**: 372, 1946.
4. PAPANICOLAOU, G. N. AND KOPROWSKA, I.: *Cancer*, **4**: 141, 1951.
5. MACCARTY, W. C.: *J. A. M. A.*, **107**: 844, 1936.
6. BRIGHTON, G. R. AND ALTMANN, F.: *Arch. Otolaryng.*, **36**: 354, 1942.
7. CLERF, L. H.: *Ann. Otol., Rhino. & Laryng.*, **53**: 335, 1944.
8. SNITMAN, M. F.: *Arch. Otolaryng.*, **42**: 178, 1945.
9. BRUNNER, H.: *Arch. Otolaryng.*, **51**: 49, 1950.
10. GORDON, G. R.: *Laryngoscope*, **60**: 1201, 1950.
11. VOTAW, R.: *Laryngoscope*, **62**: 973, 1952.
12. ALTMANN, F., GINSBERG, I. AND STOUT, A. P.: *Arch. Otolaryng.*, **56**: 121, 1952.
13. GROSSMAN, A. A. AND MATHEWS, W. H.: *Canad. M. A. J.*, **66**: 39, 1952.

MEASURING ANXIETY

A time-honoured method of detecting a guilty person in a group depends upon the appearance of sweating in the anxious individual. This technique, used for centuries by African witch doctors, is now being studied in the Department of Psychology, USAF School of Aviation Medicine, Randolph Field, Texas, in connection with the quantitative measurement of anxiety. Subjects tested are required to hold in the hand for 15 minutes a small bag containing hygroscopic crystals (anhydrous silica gel) and anhydrous cobalt chloride as a colour indicator. The result, showing the intensity of palmar sweating, is read by matching the colour of the crystals against prepared standards. Significant differences were found between results in apprehensive airmen and their calm and relaxed colleagues.

EPENDYMOMAS OF THE FOURTH VENTRICLE

ROBIN BELL-IRVING, M.D.* and
DAVID J. LEWIS, B.A., M.D.,† *Toronto*

THE DIFFICULTY of accurate diagnosis of lesions involving the posterior fossa is well known. One of the notorious lesions of the area is the ependymoma of the fourth ventricle. In childhood and in some adults it presents quickly as ventricular block with the characteristic signs of increased intracranial pressure. However when the tumour is slower growing or block does not develop, a bewildering history is often obtained of neighbourhood signs evoked from the brainstem and cerebellum. Two examples were recently seen at Sunnybrook Hospital and prompt this report.

Ependymomas are the commonest intramedullary tumours of the spinal cord. They occur throughout the ventricular system and are more frequent in the fourth ventricle (Ringertz and Reymond). They were described originally by Bailey in 1924 as tumours springing from the ependymal cells lining the ventricles and central canal. These cells are characteristically cuboid or columnar, and non-ciliated. *Blepharoplästen* may sometimes be demonstrated as a group of small rods in the cytoplasm with special stains. Bailey divided these tumours into ependymomas and ependymoblastomas, on the basis of the degree of their histological maturity. Ependymal cells are generally thought to develop through four main cell types—undifferentiated germinal cells of the neural tube, primitive spongioblasts, ependymoblasts, and finally ependymal cells. The primitive spongioblast resembles a stemmed wine glass with its mouth on the ependymal canal and its foot on the cortical surface. The ependymoblast is ciliated and the foot has been broken off the wine glass. The ependymal cell is similar except that the stem has been broken off short. Bailey makes the presence of these fibril stems the criterion of diagnosis. Kernohan uses the general appearance of the cells, having divided the tumours into cellular, epithelial and myxopapillary. The popularity of these divisions is decreasing (Ringertz and Reymond). Differentiation should be made from papillomata of the choroid plexus. Both of these tumours can be malignant.

---

*Department of Pathology, Sunnybrook Hospital, Department of Veteran's Affairs, Toronto, Ontario.
†Assistant Resident, The Henry Phipps Psychiatric Clinic, The Johns Hopkins Hospital, Baltimore 5, Md.

Tumours in the fourth ventricle occlude the cerebrospinal fluid drainage either rapidly or slowly. Several asymptomatic cases have been reported as incidental findings at autopsy (Barnett and Hyland; Russell). Surgically the tumours are formidable problems, being attached most frequently to the floor of the fourth ventricle overlying the vital centres, and fatalities have occurred suddenly during operation. Bailey reports a ten year cure in which a subtemporal decompression was done without biopsy. Both of our cases were fatalities, although one case came to operation.

CASE 1

C.W.M. This 42 year old veteran complained of constant and severe headaches and clumsiness of the right hand for two and one-half years. The headaches were frontal and occipital. The frontal element was relieved following intranasal surgery. The occipital pain increased a year before admission. It was accompanied by vomiting and made worse by sudden postural changes, straining and coughing. For the last two weeks, they were severe enough to wake the patient at night. For a year and a half, he had occasional diplopia, blurring of vision and regurgitation through the nose. For one year he had been unsteady on his feet, For six months he had had dysphagia and difficulty initiating urination, with stoppages.

When first seen, the patient had nystagmus, absent gag reflex, rigidity, wavering and awkwardness of the right arm, clumsiness in the finger-nose test and slight right intention tremor. The abdominal reflexes were absent. Position sense and stereognosis were impaired in the right hand. The patient walked with a wide base and lurched to the right. The Romberg test was positive.

After admission symptoms continued to progress until operation eight weeks later. There developed hyperæmia and a few small hæmorrhages around the left disc, marked cerebellar signs in the right hand, a cerebellar head position, static tremor and drooping of the right shoulder. There was loss of position and vibration sense in the right arm and leg.

The cerebrospinal fluid pressure was 170 mm. of C.S.F., total protein, 54 mgm. per 100 c.c. E.E.G. revealed suppression of alpha rhythm between the right ear and the lateral right occipital electrode on the right, with random 3 to 6 second waves on the right side. Uniform dilatation of the lateral and third ventricles was demonstrated by a ventriculogram.

The clinical diagnosis was a lesion involving the right side of the cerebellum or cerebellar peduncles, mesial fillet and vagal nuclei in the medulla. It was considered that the tumour was probably outside the brain-stem and infiltrating. The radiologist, however, suggested a fourth ventricular tumour with the possibility of stricture of the aqueduct.

At operation the posterior fossa was entered and a tumour was found overlying the medulla. Its inferior pole was not seen even after removing the posterior arches of the atlas and axis. A biopsy was taken and a Torkildsen ventriculocisternostomy tube was installed. Postoperatively, there was increasing paralysis of the tenth and eleventh nerves with difficulty maintaining airway. He became intermittently cyanotic and had marked variations in pulse, temperature and blood pressure. A ventricular puncture showed normal pressure. He died a respiratory death six days postoperatively.

At autopsy there was considerable postoperative softening of the right cerebellar hemisphere. A large smooth tumour distorted the contour of the upper medulla, resulting in an egg-shaped bulge, more marked on the right side of the brainstem. Microscopically the cells were grouped around clear spaces filled with fibrils. The nuclei were varied, some rounded, some oval, with mitoses rare. The tumour was well demarcated from the adherent medulla by a layer of gliosis, and reduction in the number of nerve cells was noted in the subjacent tissue.

CASE 2

R.R. This 62 year old veteran gave a 33 year history of severe epigastric and right upper quadrant pain, associated with nausea and vomiting. Repeated negative G.I. investigation was made at intervals throughout this period.

During the final three years, he had four prolonged attacks of vomiting without pain lasting, in each case, for several weeks. During each of these attacks, the patient was admitted to Sunnybrook Hospital, where he was found to have marked aerophagia and eructation. Extensive investigation was again unproductive and a diagnosis of functional dyspepsia was made each time, the patient improving markedly on bed rest, reassurance and soft diet.

The final admission was preceded by progressive weight loss, inconstant diplopia, staggering with pitching forward, worse on arising, weakness of the legs with occasional dragging of the toes and tremor of the hands for a year. Attacks of vertigo and occipital headaches had been present for five months.

Physical examination revealed a pale, fatigued looking, dehydrated man of 62, frequently swallowing and belching. His speech was thick; There was coarse nystagmus to right and left; the tongue was relatively immobile, and the mouth appeared to retain saliva. There was weakness and wasting of both lower limbs; also a slight tremor at rest of both hands, more marked on the left; reflexes were hypoactive but present. In the Romberg test, the patient fell to the left; in walking, he did not swing his arms.

Lumbar puncture, skull plates, G.I. series, barium enema, and sigmoidoscopic examinations were all normal. Electroencephalogram showed sharp waves and spikes of high voltage in the left central region, interpreted as a deep chronic lesion in that area. A diagnosis was made of a secondary tumour in the posterior fossa possibly from a gastro-intestinal or pulmonary primary.

An air encephalogram was attempted but air could not be passed into the ventricles. The cerebellum appeared normal, being outlined by the cisterna magna. The patient refused a ventriculogram.

His course in hospital was marked by four exacerbations with the same clinical picture each time. This included marked drowsiness, frontal headaches, vomiting, pyrexia and dysphagia. In addition there was paralysis of conjugate movements of the eyes, cerebellar inco-ordination, and neck stiffness. Between attacks he returned to his admission status.

Finally the patient became drowsy, disorientated and then comatose. The eyes became fixed in forward gaze and the signs of decerebrate rigidity developed. Papilloedema was not seen. Spastic paralysis of all limbs developed, occurring first on the left side, then involving both sides. The reflexes initially were increased in the limbs, more marked on the left, but the toes remained downgoing. There was paralysis of the left lower face, spreading later to the other side. The tongue protruded to the left initially and then became immobile, requiring airway and suction. The neck was stiff and painful with sub-occipital tenderness. An aspiration pneumonia developed and he died.

At autopsy the medulla was asymmetrically enlarged and fitted tightly in the posterior fossa. There was cerebellar coning. A firm greyish adherent tumour filled the fourth ventricle, compressing the surrounding structures. There was a slight amount of internal hydrocephalus of the lateral and third ventricles. Microscopically the tumour was composed of oval and regular cells with dark nuclei arranged in rosettes separated by dense glial tissue.

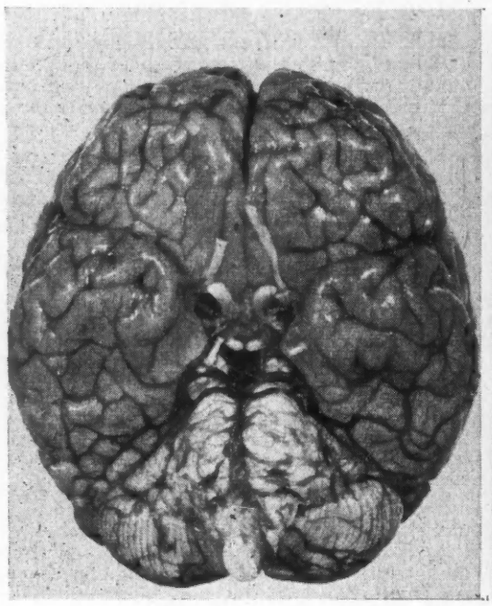


Fig. 1

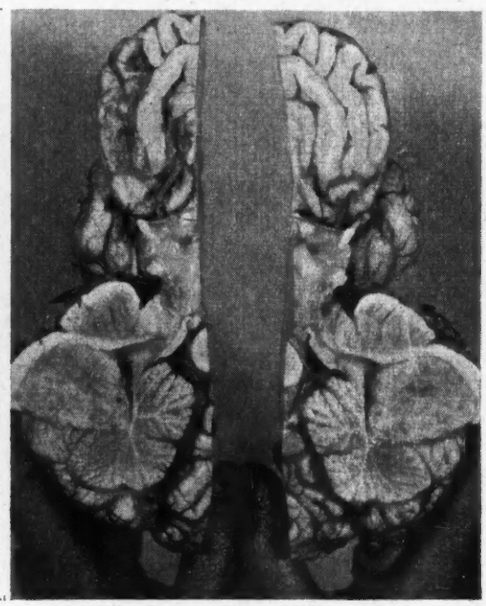


Fig. 2

Fig. 1. (Case 2).—The basal view of the brain shows the widened pons and medulla. There is furrowing of the cerebellar tonsils, which, with the brainstem, were firmly engaged in the foramen magnum. Fig. 2. (Case 2).—Midline sagittal view of the brainstem shows the tumour filling the posterior fourth ventricle. The medulla is flattened and spread; the vermis is displaced upwards.

DISCUSSION

The first case had as initial symptoms headache and clumsiness of the right hand. The headaches had a postural component, and were abruptly intermittent, suggesting a recurrent cerebrospinal fluid block. The characteristic shoulder radiation of the suboccipital headaches was not in evidence.

The simultaneous onset of urinary retention and dysphagia is characteristic of tumour of the fourth ventricle according to Bailey. In intraventricular tumours, long tract signs are rare in the cerebellar system. It is interesting to note in this case the involvement of position sense and stereognosis.

In the second case papillœdema was never seen. This would indicate that the lesion was operating more by irritation and displacement of structures than increased intracranial pressure. Hyland and Barnett noted papillœdema in 16 of their 17 cases. It is of interest that this tumour mimicked the syndrome of the middle cerebellar lobe (vermis) with difficulties of stance and gait, whereas the picture in the previous case was lateral cerebellar, with clumsiness and dysmetria of the hand. Nystagmus is found almost universally in these tumours and was present in both of ours.

The last case showed rather well the intermittent syndrome of brainstem compression referred to by Bailey, Jefferson, Cairns and Purdon Martin. The compression may produce exacerbations lasting a few minutes or several days, and usually goes on to death. It would appear to be a displacement pressure caused by the tumour mass within the ventricle, and is often independent of increased supratentorial pressure (case No. 1 above, and Jefferson). It may cause marked neck rigidity, and be more painful on moving the head. The characteristic signs of this condition are periods of decreased consciousness ("parasomnia" of Jefferson), paralysis of conjugate eye movements, tongue and swallowing; tremor at rest and of intention; vomiting, vertigo, urinary incontinence; reflex diminution, and

marked disorders of the vital functions. The last patient survived several of such exacerbations. He was relatively free of symptoms for five weeks but finally succumbed in the last. The temptation, during these crises, is to carry out a lumbar puncture to rule out meningitis. The danger is obvious.

The production of several varieties of abdominal pain by a fourth ventricle tumour has been reported before (Bailey and Gauss) and is apparently common. Gastric neurosis is not infrequently diagnosed in such cases (Barouk, Barnett and Hyland).

TABLE I.

DIFFERENTIAL DIAGNOSIS OF POSTERIOR FOSSA TUMOURS

	Fourth ventricle	*Brainstem*	*Cerebellar*		*Cerebello-pontine angle*
			Middle lobe	*Lateral lobe*	
Tumour	Ependymoma Papilloma	Glioblastoma Hemangioblastoma	Hemangioblastoma Astrocytoma Medulloblastoma	Hemangioblastoma Medulloblastoma	Acoustic Neuroma Meningioma Epidermoid cyst
Increased I-C pressure	Early	Late, except midbrain	Rapid	Rapid	Usually late, sometimes early
Cranial nerve involvement	Rare, except VIII	Early	Late	Late	Early, VIII, V, VII
Long tracts	Late	Early	Occasional	Contralateral	Late
Sympathetic	Rare	Yes	No	No	No
Stance and gait	Yes	Late	Yes	Late	No
Incoordination and dysmetria	Yes	Yes	Late	Yes	Yes
Nystagmus	Yes	Yes	No	Yes	Yes
Visceral symptoms	GI, GU	Yes	No	No	No

Less common pathological entities:
Arnold-Chiari syndrome, platybasia, congenital dislocation of the odontoid process, chordoma, aneurysm of the basilar artery, invasion by nasopharyngeal carcinoma, and syringobulbia.

These cases illustrate the widely variable courses of posterior fossa tumours. Relatively characteristic pictures for each are tabulated below. The less frequent lesions are also listed. X-ray studies may help, but explorations are usually required to make a firm diagnosis.

SUMMARY

1. Two cases of ependymoma of the fourth ventricle are presented illustrating the long, complicated and intermittent course. Tumours in this situation may produce a variety of features; these include cerebellar upsets, involvement of brainstem nuclei, the long sensory and motor tracts of the cord, the vegetative and vital centres of the medulla, signs of block to the ventricular system and signs of increased intracranial pressure.

2. A rough guide to differential diagnosis of the common lesions of the posterior fossa is included.

REFERENCES

1. BAILEY, P.: Intracranial Tumours, Second Edition, Charles C. Thomas, Springfield, Illinois, 1949.
2. BARNETT, H. J. AND HYLAND, H. H.: *Quart. J. Med.*, New Series, **21**: 265, 1952.
3. BAROUK, H.: Les Troubles Mentaux dans les Tumeurs Cérébrales, Gaston Doen et Compagnie, Paris, 1926.
4. BRAIN, R.: Diseases of the Nervous System, Fourth Edition, Oxford University Press, London, New York, 1951.
5. CAIRNS, SIR H.: *Folia Psychiatrica, Neurologica et Neurochirurgica*, Amsterdam, **53**: 193, 1950.
6. DAVIS, L. E. AND CUSHING, H.: *Arch. Neurol. & Psychiat.*, **13**: 681, 1925.
7. EDWARDS, C. H. AND PATERSON, J. H.: *Brain*, **74**: 144, 1951.
8. GAUSS, H.: *J. A. M. A.*, **112**: 701, 1939.
9. JEFFERSON, G. AND JOHNSON, R. T.: *Folia Psychiatrica, Neurologica et Neurochirurgica*, Amsterdam, **53**: 306, 1950.
10. KERNOHAN, J. W. AND FLETCHER-KERNOHAN, E. M.: *Ass. Res. Nerv. & Ment. Dis.*, **16**: 182, 1937.
11. MARTIN, J. P.: *Lancet*, **1**: 1 and 48, January, 1949.
12. MAGOUN, H. W.: *Physiol. Rev.*, **30**: 459, 1950.
13. RINGERTZ, N. AND REYMOND, A.: *J. Neuropath. & Exper. Neurol.*, **8**: 355, 1949.
14. RUSSELL, D. S.: Observations on the Pathology of Hydrocephalus, Medical Research Council, Special Reprint Series, Number 265, His Majesty's Stationery Office, London, 1949.
15. WILSON, G. AND RUPP, C.: *Tr. Am. Neurol. Ass.*, **71**: 104, 1946.

Canad. M. A. J.
April 1954, vol. 70

UN CAS DE GROSSESSE GEMELLAIRE A REPETITION MULTIPLE

JOS. A. BERGERON, M.D.,
St. Joseph d'Alma, Que.

LE QUATRE JANVIER dernier j'ai assisté une mère de famille qui donnait naissance à un sixième couple de jumeaux. Mariée le 1er mai 1946, elle a d'abord donné naissance à trois couples de jumeaux 1947-48-49, ensuite un garçon unique en 1950, suivi de trois autres couples de jumeaux 1951-52-54, c'est donc dire que dans sept ans cette mère a donné naissance à treize enfants.

Voici en résumé la famille: age des parents à la date du mariage; le père 22 ans, la mère 23.

Noms	*Date de naissance*	*Poids naissance*	*Poids actuel*
Raymond et	18 fév. 1947	1½ lbs.	———
Raymonde	" "	6 "	49 lbs.
Ronald et	18 juil. 1948	6 "	40 "
Ronaldo	" "	6 "	40 "
Jacques et	18 juil. 1949	6¾ "	48 "
Jacqueline	" "	6½ "	42 "
Clément	7 sept. 1950	6¼ "	38 "
Jules et	10 août 1951	4 "	30 "
Julien	" "	4½ "	30 "
Françoise et	10 déc. 1952	6¼ "	26 "
Francine	" "	6¾ "	29 "
Christian et	4 janv. 1954	6 "	———
Christiane	" "	6¼ "	———

1. Raymond décédé trois jours après la naissance. Faible et débile.

2. Jules et Julien prématurés 7½ mois, tous les autres sont nés à terme.

En considérant de près ce tableau nous voyons que les trois premiers couples sont nés le même quantième (le 18 du mois), et deux couples sont nés le 10 du mois, le dernier couple a brisé l'harmonie des quantièmes, mais tout de même l'accouchement était prévu entre le 8 et le 12 janvier. On voit aussi que tous les enfants sont demeurés normaux de la naissance jusqu'à aujourd'hui. Aucune infirmité et aucune malformation. Ils ont tous l'intelligence des enfants de leur âge.

Tous ces enfants sont nés à terme, excepté un couple à sept mois et demi; à leur naissance ils étaient tous normaux pesant de six à six livres et trois quart.

J'ai vu chez les auteurs que j'ai pu consulter des multiparités de grossesses gémellaires, mais la plupart du temps ces grossesses ne se rendaient pas à terme, ou bien elles étaient espacées par deux ou trois enfants uniques.

Dans le cas que nous décrivons, il y a seulement un enfant unique au milieu des six couples, et encore peut-on être certain que cet enfant était unique? Un des fœtus peut mourir dans les tout premiers mois, et l'autre continuer à vivre. Ce qui me porte à formuler cette opinion; ce sont d'abord les grossesses antérieures et postérieures à cet enfant unique. C'est encore cet enfant qui a été le plus malade et le plus faible de sorte qu'il semble souffrir d'une certaine tare. Il a d'abord fait du rachitisme, ce que on ne trouve pas chez les autres, et encore aujourd'hui, lorsqu'il est malade se défend-il très mal, surtout contre les maladies infectieuses.

Cette femme a une double ovulation à chaque menstruation, soit que les deux ovules soient fournis par le même follicule de Graaf ou par deux follicules différents siègeant soit sur le même ovaire soit sur les deux. Toutes ses grossesses ont été bivitellines. Sur les six couples de jumeaux il y a trois couples garçons et filles, deux couples de garçons et un couple de filles, donc différence de sexe. Chaque fœtus est enfermé dans une loge spéciale constitué par un chorion et un amnios et les deux placentas se touchent par leurs bords donnant l'impression d'un placenta unique, mais lorsqu'on y regarde attentivement on trouve toujours deux placentas distincts.

Les jumeaux univitellins présentent habituellement tout au point de vue physique qu'au moral une ressemblance parfaite et les fœtus sont toujours du même sexe. Pour les jumeaux qui nous concernent il n'y a pas cette ressemblance parfaite ni au point de vue physique ni au point de vue moral, même pour les couples du même sexe.

Certains auteurs nous disent que l'hérédité a une action non douteuse surtout celle de la mère. Pour ce cas l'hérédité ne semble pas entrer en ligne de compte. D'abord pour le père aucun antécédent jusqu'à la quatrième génération; chez la mère à la quatrième génération on trouve un couple de jumeaux. L'hérédité ne joue donc pas un grand rôle dans ce cas.

Je soumets à l'attention de la profession médicale ce cas extraordinaire, unique et typique en son genre. Je sais que les chercheurs vont nous donner leurs opinions sur ce cas.

MULTIPLE TWIN BIRTHS

JOS. A. BERGERON, M.D.,
St. Joseph d'Alma, Que.

ON JANUARY 4, 1954, I delivered a patient of her sixth pair of twins. Married on May 1, 1946, she had given birth to twins in three successive years, 1947, 1948 and 1949; then one boy in 1950, followed in the next three years by three other pairs of twins.

Thus in seven years this woman has borne thirteen children. She was 23 and her husband 22, at the time of their marriage; the following is a tabulation of this remarkable family.

Names	*Date of birth*	*Birth weight*	*Present weight*
Raymond	Feb. 18, 1947	1½ lb.	(Died in 3 days)
Raymonde	" "	6 lb.	49 lb.
Ronald	July 18, 1948	6 lb.	40 lb.
Ronaldo	" "	6 lb.	40 lb.
Jacques	July 18, 1949	6¾ lb.	48 lb.
Jacqueline	" "	6½ lb.	42 lb.
Clement	Sept. 7, 1950	6¼ lb.	38 lb.
Jules	Aug. 10, 1951	4 lb.	30 lb.
Julien	" "	4½ lb.	30 lb.
Francoise	Dec. 10, 1952	6¼ lb.	26 lb.
Francine	" "	6¾ lb.	29 lb.
Christian	Jan. 4, 1954	6 lb.	——
Christiane	" "	6¼ lb.	——

The first boy (Raymond) died three days after birth; he was a weakling.

The fourth pair was premature at 7½ months. All the others went to term.

It will be noted that the three first pairs were born on the 18th of the month, and two pairs on the 10th. The last pair broke the rhythm, but the date had actually been calculated to be between the 8th and the 12th.

The remarkable features of this case are: the short period of time in which the children have been born; that they all went to term, except one pair; and their healthy condition, except for the first boy. According to such authorities as I have been able to consult, such multiple gestations do not usually reach term, and also, they are usually interrupted by two or three single births.

In this instance there is only one single birth amongst the six pairs, but was this actually a single birth? It is possible for one fœtus to die early after conception and for the other to continue its growth. I suggest this partly because of the twin births preceding and following the single; also because this child is of weak constitution; for example he showed evidence of rickets, which did not occur amongst the others, and his response to any infections is more severe than in the case of the other children.

It looks as if this woman has a double ovulation at each menstruation, either from the same Graafian follicle, or from two follicles in the same ovary, or from the two. If this is so, why this single birth?

These were all fraternal twins; three pairs of a boy and a girl, two pairs of boys and one pair of girls. Each fœtus had its own chorion and amnion, and whilst the placentas were in contact with each other, careful examination showed that they were distinct from each other.

Identical twins resemble each other very closely both physically and in their nature. Even in the pairs of the same sex in this series, there was not this exact resemblance, either physically or in their temperament.

Heredity does not seem to have played any part in this case. The father's family had had no twins for at least four generations back, and on the mother's side there had been only one pair of twins four generations back.

ACUTE LARYNGOTRACHEOBRONCHITIS

A. K. BRADSHAW, B.Sc., M.D., *Stettler, Alta.*

IN NOVEMBER 1952 a two year old boy developed acute laryngotracheobronchitis which had several interesting features that prompted me to make this report. We have had about four similar cases in the past two years but only one other case required tracheotomy and this was in an elderly lady of seventy, which was unusual for her age group. The child's case is as follows:*

This child aged 2, was seen in the office with a ten hour history of shortness of breath, sore throat and choking. The mother considered that the child had tonsillitis; on her bringing it to the office I was quite amazed to see that the child was in a severe respiratory condition showing cyanosis and an inspiratory crow, perspiring, elevated temperature and obviously quite ill. The past history showed otitis media in March 1952 and tonsillitis in May 1952. He had been inoculated against diphtheria. No other serious illnesses or operations. Family history was irrelevant. Physical examination showed temperature to be 101.6°, tonsils to be large and a bit red. There was cyanosis, indrawing of the supra-

*The author had prepared an introductory account of this condition, but these details are already covered in the paper by Dr. J. A. Turner on the same subject: see page 401 of this issue.—EDITOR.

sternal notch and rib spaces, with a suggestion of loss of breath sounds and dullness in the right lung. No wheezing or tracheal thud could be heard. He was x-rayed immediately and no foreign body was seen in these films so he was admitted to the hospital for immediate bronchoscopy, using no anæsthesia. At this time the typical picture of acute laryngotracheo-bronchitis was found, and thick crusts of inspissated mucus were removed from the tracheobronchial tree. No cultures were taken, unfortunately, at this time. This was considered at first to be a case of foreign body and after bronchoscoping him it was relieving to see the dramatic improvement of his colour and symptoms.

Later that night he became dyspnœic again and it became obvious that he would require a further bronchoscopy. On attempting to do this it was found that the larynx was so swollen from the infection and instrumentation that the bronchoscope could not be inserted between the vocal cords, so a tracheotomy was done under local anæsthesia with immediate relief. Approximately ten days later, on December 4, the child developed a high fever and this was relieved by bronchoscoping him and sucking out the tracheobronchial tree again. The treatment in the hospital at this time was one of frequent and constant tracheal aspirations, blood, subcutaneous fluids, oxygen, humidity, penicillin, streptomycin, and later tonic and iron. Extubation was carried out gradually and the patient was discharged on some oral antibiotic and tonic on December 24.

Laboratory findings are unnecessary to report apart from the fact that he soon developed an anæmia. The leukocytosis, which reached 12 to 15 thousand, improved before he was discharged. There was a culture taken from the tracheotomy tube shortly after he developed the high fever to determine any organisms that we should possibly be treating with other antibiotics and the direct smear showed no pus cells, many Gram-negative bacilli which proved to be coliform and were paracolon bacilli and alkaligenes. These were sensitive to chloromycetin. There was scant *Staph. aureus* and *Strep. viridans* which were also sensitive to chloromycetin.

He was seen again at the office on January 8, 1953. As his mother said "He had a cold and when he cried he became blue." She also noticed that his voice was higher pitched than usual. With this history I suspected possibly a complication of tracheal obstruction and did a lateral tissue x-ray of the neck to find a granulomatous area occurring from the anterior wall at the site of the tracheotomy which partially obstructed the tracheal lumen. The chest x-ray appeared satisfactory. I admitted him to the hospital to relieve the cold and then later remove this granuloma endoscopically.

On this second admission I was waiting for his respiratory condition to improve and then remove the granuloma. On the night of January 24 I was phoned by the nurse that the child was in extremis and apparently completely obstructed while having a crying spell that evening. On rushing over to the hospital I did not have time to get my endoscopic equipment ready so put an endotracheal tube into his glottis through the nasopharyngeal passage and left it there until the next morning when I bronchoscoped him and found that the granuloma had broken off and was likely coughed up. After removing this tube the child developed a further laryngeal obstruction and had to have another tracheotomy done on January 25 when his colour was poor and the breath became quite difficult. His course in the hospital after that was a gradual improvement and the laboratory findings were insignificant apart from mild anæmia which was treated. The extubation was carried out and he was discharged from the hospital feeling well. I have heard no further report of respiratory distress from the parents of this boy and the scar has healed well.

DISCUSSION

During the winter months when this disease is more prevalent we should certainly be on the lookout for the colds that seem to get worse or when the parents think their child has suddenly developed asthma. Early diagnosis and treatment are lifesaving in these cases. I saw several children die while I was interning on pædiatrics years ago, who could have still been living if early tracheotomy had been done on them. This cannot be too strongly emphasized as it is the key to successful treatment. It is much safer and simpler to do this early and elective procedure under local anæsthesia than to do a hurried, dangerous and shocking procedure, probably too late. Adequate oxygen and humidification in addition to the tracheotomy are important in this early treatment.

Nursing care with proper instruction and training in frequent sterile suction, occasional saline drop instillation, and constant vigilance for signs of complications are essential. The tired child should be checked even more carefully for signs of bronchial obstruction, acidosis, dehydration, and blood or cardiac complications. Avoidance of too much therapy, laboratory tests, visitors, etc. all have to be considered in preventing fatigue. The early appearance of pulmonary complications with elevated temperature, increased respiratory rate, fatigue, etc. is an indication of a bronchial obstruction and the prompt suctioning with change in position of the child usually relieves this temperature, but if it is not cleared up in a very short time and no other reason for its appearance can be found, then bronchoscopic aspiration is very rewarding. No antitussives, sedatives, atropine, or opiates should be given since they thicken secretions or prevent the cough which is so necessary to expel the exudate.

A recent article by Ravenel and Greensboro[7] shows dramatic results with the use of "alevaire" as a means of humidification. The old method of "steaming" has the obvious disadvantages of burn hazards, discomfort to patient and attendants, and the tendency to produce hyperpyrexia in an already febrile patient. Since then the use of "cold steam" in the croup tent has been the usual form of giving humidification. The only disadvantage to this method was the loss of the humidification in the lung concentration due to evaporation. With the advent of alevaire* the authors of the above publication claim astonish-

*"Alevaire" is produced by Winthrop-Stearns and consists of 5% glycerine, 2% sodium bicarbonate, and "triton WR —1339" 0.5% in distilled water (an alkylaryl polyether alcohol detergent).

ing results in many conditions and think that tracheotomy will no longer be necessary. My feeling after reading this article was that it will certainly lessen the necessity of tracheotomy but *early* tracheotomy supplemented with this method of humidification seems the safest method if any great deal of respiratory embarrassment is present.

The bronchoscope is very useful in these cases in obtaining cultures and removing obstructive and tenacious secretions that may be present. It is the final word in determining the diagnosis since the bronchoscopic appearance of the tracheobronchial tree in these cases is pathognomonic. The bronchoscope has definitely been shown to be a diagnostic and therapeutic instrument in this particular case. It was quite a problem for me to decide whether the granuloma that developed at the site of the previous tracheotomy would be better removed surgically or endoscopically and whether the site of removal should be cauterized. It was the advice of my teacher, Dr. P. H. Holinger of Chicago, that it should be removed endoscopically with ball-bearing type of bronchial forceps. He did not advise the use of cauterization at the site of the tumour even if it were to recur.

SUMMARY

The case is reported of a two year old boy who showed a typical picture of acute laryngotracheobronchitis with complications of bronchial obstruction, laryngeal œdema, toxæmia, recurrence of the disease and postoperative tracheal granuloma. We have emphasized the importance of early diagnosis and treatment, particularly the early elective tracheotomy. The use of the bronchoscope as a diagnostic and therapeutic instrument in this case has been well illustrated. Emphasis was also placed on the proper systemic care of these cases in order to avoid severe complications that develop such as septicæmia, toxæmia, endocarditis, acidosis, and dehydration. Mention has been made of the use of "alevaire" as a means of humidification.

I would like to take this opportunity of expressing my appreciation to my colleagues who were so helpful in the successful management of this case—Dr. J. S. Campbell who did both tracheotomies and handled the postoperative tracheotomy and extubation care so well; and to Drs. G. P. Weih and J. M. Waddell who gave valuable assistance at times of my absence.

REFERENCES

1. JACKSON, C. AND JACKSON, C. L.: Bronchoesophagology, Saunders, Philadelphia, 1950.
2. BENEDICT, E. B.: Endoscopy, Williams and Wilkins, Baltimore, 1951.
3. BRENNEMANN, J.: Practice of Pædiatrics, W. F. Prior Co., Hagerstown, 1938.
4. HARRISON, J. R.: Principles of Internal Medicine, Philadelphia, 1950.
5. TICE, F.: Practice of Medicine, W. F. Prior Co., 1932.
6. BRIGGS, J. N.: *Winnipeg Clinic Quarterly*, 5: 140, 1952.
7. RAVENEL, S. F. AND GREENSBORO, N. C.: *J. A. M. A.*, 151: 709, 1953.

Special Article

MEDICAL INSTITUTES*

ALAN GREGG, M.D.,
Big Sur, California, U.S.A.

I SHALL AVOID a common practice of speakers, namely to begin so far away from the subject that their hearers, more nearly captive than captivated, sit in strained bewilderment, which the speaker misinterprets as interest, though actually they are waiting for some reasonable clue as to what he has chosen as the subject of his talk. I am going to talk of institutes in the field of medicine: not of this Institute but rather more broadly and generally of medical institutes, their nature, purposes, and component parts.

Having thus advised you of my direction and destination these remarks will now admittedly begin at some distance from the subject, the better to locate it in the matrix of the facts that make the kind of human associations we call *institutes* important now and for the morrow of Medicine.

By a notable if not, indeed, a very remarkable quality of human intelligence we are at times able to guess that some statement is probably important even when we cannot honestly say we fully understand it. My younger years were studded with experiences of this sort, often elusive, sometimes incomprehensible, but nearly always memorable. Consequently I came to relish Swedenborg's definition of revelation as "a clouding over or obscuring of Divine Truth". Such experiences were not to be dismissed with the easy apostrophe of "important if true". They were more arresting than that, for they deserved the comment "important if understandable".

Now among such revelations—in the Swedenborgian sense—that I remember vividly was a remark made at Oxford to my chief Dr. Richard

*Address at the Montreal Neurological Institute, at the opening of the new wing, November 20, 1953.

Canad. M. A. J.
April 1954, vol. 70

M. Pearce. I cannot trust my memory but I think it was Sherrington who made it. It ran in this wise:

> "After some hundreds of years of experience we think we have learned here in Oxford how to teach what is known. But now with the undeniable upsurge of scientific research, we cannot continue to rely on the mere fact that we have learned how to teach what is known. We must learn how to teach the best attitude to what is not yet known. This also may take centuries to acquire but we cannot escape this new challenge—nor do we want to."

I knew at the time that that statement was important but I also knew that it would take me time to understand it. It has. Even after some thirty years I cannot be sure I understand all its implications. For example, is it profitable to regard an institute in one of the clinical branches of medicine as the right way to teach the best attitude to what is not yet known? Is learning the right attitude to the unknown the vital core of this new form of association we call an institute? I think it probably is. But even more probably, I think it is wise to reflect on what institutes are, suspending final decision until we see the matter as a whole. I wonder, for example, whether the research method will not transform the structure, the methods and the purpose of all of university education in, say, the next five decades. And what of secondary education? Indeed will education as a whole not be profoundly changed? Is an institute the forerunner and the prototype of higher education in the future?

For still another reason some increased reflection upon what we call institutes may be needed today and in the future. All human institutions must reckon with two forces. Their resulting conduct represents a sort of parallelogram of forces. One is the inherent intent to supply stability of purpose and effort, the other is to be promptly and delicately responsive to changes in the environment and even changes in objectives. The French economist Francis Delaisi had an interesting interpretation of institutions. Their purpose, he held, was to supply the stability needed for long-term operations. For the long-term operation of raising a family we have the institution of marriage. For the raising of crops we have the various institutions of real property, land tenure, etc., so that he who ploughs may reap. For manufacture and commerce we have banks. For education we have schools and universities. Indeed Delaisi was so impressed by the constancy with which institutions supply stability for human effort that he came to regard stability no longer as a mere characteristic of institutions but rather as the essential purpose of institutions—namely to provide the stability that men and women of tenacious purpose require for bringing long-term operations to a successful end.

And yet we cannot safely exalt our need for stability and continuity to be the end-all of an institution. We must needs adjust the institution to change—or see it perish of its own brittleness. Who can deny that stability can be pushed too far? It was Bertrand Russell I believe who suggested a new and impish form of conjugating various verbs: "I am firm, you are insistent, he is pigheaded" or "I think, you cerebrate, he theorizes" or "I am open-minded, you are uncertain, he is positively schizoid." Obviously even excellent resolves and policies can be pushed too far—there comes a time when it is reasonable to dispense with reasons. Even certainty, stability and determination have their proper limits. As Oscar Wilde observed "When you break the little laws the big laws begin to operate."

And so with human institutions: stability must reckon with adjustability if we are to be concerned with survival. Nearly all institutions, and *a fortiori* institutes, maintain a precarious balance between opposing forces; tenacity in the face of adaptability, stability risking extinction in a world forever changing.

If the very survival of human associations depends upon the skill with which they steer between the Scylla of senseless rigidity and the Charybdis of unpredictably erratic changefulness, then what is the wise course in these singularly changeful times in which we live? For clearly we live at a time when the circumstances of daily life are changing more rapidly than they have ever changed in man's experience. As Elton Mayo insisted ours is an adaptive not a traditional civilization. What tradition could we consult to guide our conduct in point of atomic bombs, jet planes, and television, antibiotics, ACTH, artificial insemination and even artificial rainstorm? What guidance is there in the Hippocratic Oath for the problems of birth control? There is no mention even of preventive medicine in that Oath.

For these reasons and their cumulative impact on our traditional forms of living and working together, I would insist that we would be wise to hold our medical institutes up to careful review; not because I suspect there is something wrong about them, but because it is so important to know exactly what is right about them, and thus what we can count on. Goethe held that it is important to know as much as possible about what you want most of all, because sooner or later you are so likely to obtain it.

Medical institutes generically have for me two leading characteristics; one, that of a deliberate independent identity, and the other that of something initiated or originated for a new and specific purpose. The words "task force" connote an *ad hoc* specified focus of attention and energy. One might say, if the new phrase has not already become a cliché, that an institute is an institutionalized task force.

Now the advantages of having a declared and recognized separate status for an institute in a university depend in large measure on the way

in which it articulates with other members of the body corporate. I like my arms to have separate parts articulating with each other by means of strong, supple and painless joints, though of course complete rigidity from shoulder to finger tips might appeal to the administrative principles of uniformity, simplicity of control and predictability of behaviour. Clearly an arm with several separate units articulating painlessly, freely and yet tightly works far more effectively than a single rigid unit. Everything depends on the quality of the joints. By the same token the character of an institute's articulations with other members of the university decides whether you will be partners in a beautifully supple and adroit instrument, or contributors to acute rheumatic inflammation or a chronic anchylosing arthropathy; in simpler terms and fewer syllables —a flail instead of an arm.

There are other reasons for an institute to have recognizable identity. Separate status provides a focal point not only for the loyal energies of its members but also for the interest of its actual and potential supporters. Human loyalty seeks visible, tangible objects of manageable proportions . . . need I expatiate on the theme of loyalty to the clan of Scots descendants in Montreal? Sir James Barrie acting as toastmaster at a dinner in London on St. Andrew's Night opened with the remark "I have always thought that it was right and proper for the Scots resident in London to assemble at least once a year and examine that grave question: is there any defect in the Scot's character?" Though apparently a purely rhetorical question it could perhaps have well been answered by another question (for Charles Lamb says that a Scotsman "lives in a twilight of dubiety"), namely, "is there not a limit to the extent to which clannish loyalty can wisely go?"

Besides serving the purpose of stability and continuity both of effort and of the best circumstances for effort, an institute can help to stimulate as well as to reassure its members. By the very self-imposed circumscription of its size and ambit an institute can provide an extraordinary aid to human effort and satisfaction, namely the chance to be intimate with excellence. Whether we invoke memory, or bear witness to our present and immediate experience, who of us will set a trivial value upon intimacy with excellence? If that intimacy be sacrificed, whether because of increased size or excessive busyness, then the members of any institute can look at each other in justifiable dismay.

Granted that an institute articulates smoothly and well with other parts of the university and that its members are loyal and devoted, and that its size and activity actually permit, as well as theoretically encourage, excellence to be attained and be felt, there is one more purpose an institute must serve. Not only must there be a differentiation of function and a division of labour amongst its members, but there should be an air of expectancy among them: expectancy not merely that each will do his expected task well but that in some way not yet clear each will bring to the work of the institute something distinctly and peculiarly his own, and in his own good time will add something unique to what may be expected of one in his position. A division of labour that is not accompanied by the enhancement of personal dignity and individuality offers no permanent solution to the difficulties of collaborative work. My phrase "the atmosphere of expectancy" refers to the value of realizing that men can be more than the positions they occupy, and that in medicine, as in art, there remains for each of us the problem of style. This shows in a comment I remember about Dr. Rhea here in McGill. "It wasn't merely that he was a good teacher: he was. But it was the *way* he taught and lived." That kind of comment is healthy and it is bracing. The members of institutes cannot be wasting time when they brood upon the problem of style—for both teaching and research are ways of life.

The greatest and deepest need of a medical institute is to be needed. The immediate and the long-remembered success of many an *ad hoc* organization came quite simply from the fact that it met a cogent and widely recognized need. Indeed the kudos and honour of some emergency organizations, once their task is done, becomes so extraordinary that mere membership becomes a much sought-after honour; in short, the organization becomes honorific and no longer meets any need more urgent than that of ambitious vanity.

Now there are needs that are recognized and there are needs that are unrecognized. To create an institute to meet a need that is widely felt and already formulated requires no mean abilities: to institute an organization to meet a need not yet perceived by most men calls for quite exceptional talents. But the cardinal question must always remain—is there a real need? Furthermore there is a delicate question nearly always of great practical importance, the question of timing, for it is quite possible to organize an institute so long before the need it will meet is generally recognized that support for the institute cannot be found in time to save it.

As one who has had thirty years' experience, both direct and vicarious, with widely different forms of financial support to institutes and departments of medicine and surgery and various special fields, I believe that endowment—whether from government or private sources—is the soundest way to secure optimum results when it is certain the work to be done is needed. The steady confidence that is conferred by endowment calls out from scientists honesty and steadfastness of purpose: the hesitant uncertainty of short-term grants all but insults the intelligence if not the sincerity of the recipient and certainly

Canad. M. A. J.
April 1954, vol. 70

makes a mockery of long-term planning. Experience is our teacher in this matter. Indeed it cannot be news to some of you that a reaction has set in against short-term grants. They have favoured hasty work on trivial questions. They dissuade the honest and more circumspect young men from entering investigative careers. Though there are occasions when $50,000 a year for two years may be needed for some urgent problem I would prefer the income from that sum, $4,500, as dependable: that is my considered judgment.

You will notice that till now I have not referred to the leader of an institute but only to the members. Now the days when men at 24 or even younger took command of whaling ships as captains, have gone. Perhaps the earlier frontier universities of the past hundred years gave comparably early responsibility to young men in academic life. But as the preparatory stages become longer and the candidates more numerous we may expect to see more rarely the load of leadership of institutes falling on men when they are really young. Perhaps the only thing I find myself wanting to say to most new leaders of institutes is this: you will find the task a little lonelier than you expected. As a corrective you may do well to find someone not on the payroll, a man of perfect discretion and considerable detachment with whom you can discuss your problems with complete freedom and confidence. Indeed there is some evidence suggesting that some of the most successful leaders of medical institutes took counsel quietly and steadily with one or two advisers. Certainly Simon Flexner relied on William H. Welch in that way.

The best leaders of scientific institutes whom I have known had only this in common: they made their values known and felt throughout the organization. I used to be puzzled that success as the head of an institute seemed to reward so wide a variety of temperaments, capacities and characters. There did not seem to be any one formula to explain the leader's role. At long last I came to see that what a leader transmits is the quality and the variety of his values, for he is quick to recognize and encourage in others those qualities, purposes and interests that seem most significant to him.

One other aspect of leadership in a scientific institute relates to the number of men on its staff. If we are to take seriously the opinion of students of administration we should be critical of the leader who has more than eight men reporting to him. Doubtless leaders vary in point of the number of colleagues with whom they can work effectively, to whose work they can bring discriminating and helpful encouragement and criticism, and of whose lives they can be effectively informed. Eight may not always be the maximum, but of one thing I am sure: the capacity to work with others has not increased as rapidly as travel and communication has become quick, cheap and easy to initiate. No sooner did we put in inter-office telephones than staff lunch or tearooms became necessary. When the body possesses the lymphatic system, the circulatory system and the nervous system each devoted to some form of transport, communication and co-ordination, we may well suspect that the factor to pay most attention to in deciding the size of an institute is not the possible work to be done, nor the number of possible subdepartments, nor the size of its budget, nor the number of candidates for staff positions, nor the size of similar institutions elsewhere, but something more stark and searching—the quality of communications between its members, their clarity, brevity, completeness, promptness, and sincerity. That is what makes an Institute.

Directly related to the most desirable size of an institute and also of capital importance to the future, stands the subject of recruitment. Rather than attempt to review many of its aspects I would like now merely to submit for your consideration a new word and the need I feel for it. The word is decruitment. Recruitment comes from the French *recroître*, to grow again. It has not quite the same meaning as increase but rather the idea of replacement of expected losses. But in some of the best institutes I have known nobody wants to leave. What is needed is a decruitment policy, as clear and automatic and impartial as can be, with this new specific word decruitment as impersonal as a uniform and without any overtones of disapproval, failure or disappointment. The policy of decruitment means that all recruits ought to leave after a stipulated period of two or perhaps four years and those that are wanted back can be called back after a lapse of not less than a year. Like retirement policies whose application becomes more invidious with every infraction, recruitment without any policy of decruitment seems insincere. Indeed it seems ominous. It suggests to me one of the common characteristics of cancer cells—they lack self-control. So I commend to you a new word—decruitment—to draw attention to what is needed in place of the shoddy euphemism "He was let go," as though he was straining at the leash and choking for departure—which he was not, and everyone knew it. We can have something cleaner than that.

Having referred to institutes in terms of their purposes and the role of membership, leadership, size and ways of self-renewal, I come to the subject of trustees or other forms of control and supervision. Here, too, rather than try to cover the subject, I would underscore one aspect of trusteeship that deserves more attention than it seems to receive. There are not enough trustees who brood over the affairs of our institutes. Now brooding as a word may connote to some of you meanings I do not have in mind. I do not mean by brooding fussy and officious interference, or gloomy preoccupation with problems that cannot be briskly solved, or plausible arguments that

the ship is sinking and should be scuttled in favour of some coracle made of balsa wood. No. By brooding I mean first a thorough working knowledge of the institute's affairs and then what its problems are, what are the unseen needs it could be meeting, what is dubious and what is certain in its future, and especially whether in objective, as well as in performance, the institute is striking the right balance between stability and adjustability, between unflinching adherence to existing purposes and a suppleness of adaptation to a constantly changing world of knowledge and of need. By brooding I mean the constant weighing of what *is* against what *could be*, the steady, quiet evaluation of the potentialities as well as the actualities of the institute. A good brooder is at home in the subjunctive, in the language of unreality, for the future almost by definition is not yet real.

Using such criteria we come to face the undeniable fact that the quality of trusteeship in our institutes deserves itself some brooding. Indeed brooding has been the key in which this talk is written. Too vague, perhaps, too general and too inclusive. So let me close in a contrasting vein of specific, local and exclusively historical fact.

In but very few if any of the enterprises to which the Rockefeller Foundation has been privileged to contribute in the last twenty years have the results equalled those you have created here in this Neurological Institute. If I were asked to name a single grant that the Medical Sciences Division of the Foundation has made since 1931 that I consider ideal in purpose, in performance, in local response and in national and international influence, and in the character of our relationships maintained from the very beginning, I would say without a moment's hesitation the grant to the Neurological Institute of McGill University. But that is only one way and perhaps a trivial one of expressing the admiration and the satisfaction the Rockefeller Foundation has for what you have created here. More rare still is the compliment I would offer you, not without some fear that it will miss its target, in saying that in this Neurological Institute, the Staff, the Chief and the Trustees are so beautifully fused into one shining amalgam that if I were to name one to thank I would be naming you all who have worked with him, for him and through him, and if I were to name all of you it would come to the same thing—for you are all the Neurological Institute of McGill University, each to the other, responsible, essential and inseparable.

Clinical and Laboratory Notes

PSYCHIATRIC EXPERIENCES WITH PLEXONAL*

V. A. KRAL, M.D. and
W. G. KRAUSER, M.D., *Montreal*

CLINICAL OBSERVATION as well as neurophysiological studies have furnished ample evidence of the complex neural mechanisms involved in emotional reactions.[1] There is some indication that, within certain limits, different emotions are characterized not only by their specific feeling tone but also by relatively specific innervation patterns particularly with regard to the autonomic discharge. However, quantitative and even qualitative variations of the autonomic innervation patterns in different individuals have been observed by many workers. In addition, it would seem that with increasing severity of many emotional reactions a rather uniform shift occurs in the autonomic innervation in favour of the sympathetic component.[2] The use of potent, short-action, sympathicolytic agents in relatively high dosage has therefore met with remarkable success in severe emotional disturbances of various kinds.[3]

If, however, in conditions of less severity a sedative for longer use is needed it should comprise pharmacodynamic agents intended and able to influence the different components of the complex emotional innervation mechanism. It was for this reason that Plexonal, a composite preparation containing barbiturates, scopolamine hydrochloride and dihydroergotamine methanesulfonate, has been tried in psychiatric patients with emotional disorders. In this preparation the central sedative action of the barbiturates is combined with the central depressant and peripheral parasympathicolytic effect of scopolamine hydrochloride[4] and the sympathicolytic action of dihydroergotamine methanesulfonate. The latter has been demonstrated by Rothlin and his associates,[5] to counteract excitatory as well as inhibitory adrenergic functions.

In this study Plexonal is evaluated both as an independent therapeutic agent and as an auxiliary tool to be used concurrently with other forms of treatment (shock- and/or psychotherapy).

Plexonal is dispensed in two forms, tablets and suppositories. Each Plexonal tablet contains:

Sodium diethylbarbiturate	0.045 g.
Sodium phenylethylbarbiturate	0.015 g.
Sodium-allylisobutylbarbiturate	0.025 g.
Scopolamine hydrochloride	0.00008 g.
Dihydroergotamine methanesulfonate	0.00016 g.

One Plexonal suppository is equivalent to three Plexonal tablets.

*From the Verdun Protestant Hospital, Montreal, Canada. Plexonal was generously supplied for this study by Sandoz Pharmaceuticals, Montreal, P.Q.

Canad. M. A. J.
April 1954, vol. 70

MATERIAL AND METHOD

The drug was given to 55 patients, 14 men and 41 women, all of whom were committed to a mental hospital. In addition 18 patients (5 men and 13 women) not committed to hospital, were treated with the same drug.

The group of hospitalized patients (age range 15 to 79, mean age 45 years), comprised 14 cases of manic depressive psychosis (12 manic, 2 depressed), 9 involutional psychoses, 16 cases of schizophrenia, 10 organic psychoses (arteriosclerosis, G.P.I., senile dementia) and 6 neurotics whose behaviour disturbances had necessitated commitment.

To 43 of these patients the drug was administered in tablet form, whereas 6 received plexonal suppositories. In another 6 cases both forms were used. The dosage and the mode of administration varied according to the condition of the patients. Most of them received two tablets four times a day; in some cases the dosage was lower, one tablet three times a day, and only occasionally higher, up to three tablets three times a day. One suppository was used instead of three tablets. In cases where both forms of administration were used, the tablets were given in day time and the suppositories at night. It should be pointed out, however, that in some cases, plexonal was given in addition to shock treatment and/or psychotherapy, whereas some patients were maintained on plexonal alone at that time.

The group of 18 non-committed patients (age range from 29 to 58 years, mean age of 42.2 years), comprised 5 manic depressives (4 in the depressed and 1 in a hypomanic phase), 2 involutional psychoses and 11 neurotics, most of them with anxiety neuroses.

These patients received plexonal only in the form of tablets, usually two tablets three times a day and at hour of sleep, when first seen. The treatment schedule, however, was sufficiently elastic to allow reduction or increase of dosage according to the patient's condition. Suppositories were not used with this group. Treatment was continued usually for two to three weeks and then gradually discontinued. In these cases plexonal was used in combination with psychotherapy.

Before plexonal medication was started the use of other sedatives was discontinued. We tried to establish its effect as a day sedative and as a hypnotic separately. Notes were kept with these points in view. It was, however, not easy to differentiate these two actions. When day sedation was effective, sleep was induced more easily. Our evaluation was therefore focused on the overall sedative action of the drug. The patients were regularly checked for effects on blood pressure, pulse and possible side reactions.

RESULTS

The results were graded in three categories: good, fair, negative. A good result was recorded when the patient became quiet and manageable on plexonal alone, with the establishment of a normal sleep pattern. A fair result was noted when the patient, although relieved of part of his distressing symptoms, still remained in need of some other sedation. Negative results were noted when no beneficial effect was found with plexonal and other sedatives had to be used.

Plexonal was usually effective after thirty-five minutes when taken by mouth, in twenty to twenty-five minutes when given as a suppository. Its sedative action was described by patients capable of reporting their experiences as relaxant rather than "doping" when taken in day time. The hypnotic effect of two or three tablets or one suppository given at night lasted for about five or six hours. No hangover was reported after awakening.

Statistical evaluation (chi-square method) demonstrated no significant difference in the results obtained in men and women or between the age groups of under and above fifty years. The results in our observation were not dependent on sex or age of the patients.

Using the criteria mentioned, we found in our material of 55 committed patients, 18 with good, 21 with fair and 16 with a negative result. In other words, 70.9% of our committed patients obtained appreciable benefit from plexonal medication ranging from fair to good results. Of the 18 non-committed patients, 10 had a good, 4 a fair, and 4 a negative result. The percentage of appreciable results in this group was 77.8%.

Our results according to diagnostic categories are given in Table I. Although considerable differences in the plexonal effect appear, particularly with regard to the good results, statistical evaluation showed that these differences are not significant. Plexonal can therefore not be considered a sedative specifically suitable or unsuitable for any of the diseases treated.

TABLE I.

MATERIAL GROUPED ACCORDING TO DIAGNOSIS

	Results			
Diagnosis	*Good*	*Fair*	*Negative*	*Total*
Manic depressive, manic	3	4	6	13
Manic depressive, depressed	2	2	2	6
Involutional psychosis	3	7	1	11
Schizophrenia	8	5	3	16
Organic psychosis	2	4	4	10
Neurosis	10	3	4	17
Total	28	25	20	73

In Table II the material is grouped according to the psychopathological condition which necessitated sedation. The first group comprises 40 cases whose main symptoms were anxiety and/or

tension accompanied by vegetative signs like tachycardia, dilated pupils, tremor, sweating. Out of these 40 cases, 21 obtained a good result, 13 a fair and 6 no result.

The second group comprises, under the term "psychomotor overactivity", 26 patients whose behaviour was characterized mainly by overactivity and talkativeness but without conspicuous involvement of the vegetative nervous system. Seven of these patients obtained a good result. In 9 cases the result was fair, whereas in 10 cases no result was achieved.

Out of a third group of 7 psychotic patients, to whom plexonal was given in an attempt to prevent frequent uncontrollable and unpredictable emotional outbursts, 3 obtained a fair and 4 no result.

TABLE II.

MATERIAL GROUPED ACCORDING TO PSYCHOPATHOLOGICAL CONDITION

	Results			
Symptomatic category	*Good*	*Fair*	*Negative*	*Total*
Anxiety	21	13	6	40
Psychomotor overactivity	7	9	10	26
Emotional lability	—	3	4	7
Total	28	25	20	73

These differences in the plexonal effect were found statistically significant.

It would appear therefore that plexonal in our observation proved an effective sedative in anxiety and tension states even in the relatively small doses applied. Appreciable benefit was also obtained in the second group with "psychomotor overactivity". Our results with the third group, however, tend to show that plexonal can prevent emotional outbursts in psychotic patients only to a limited degree.

All patients were closely observed for possible adverse side-effects of the plexonal medication. No untoward reactions of note occurred. The blood pressure and the pulse rate remained within physiological limits and no effect on the uterine or smooth musculature was observable. In cases where plexonal suppositories were given several times daily, some drowsiness occurred accompanied by horizontal nystagmus, slight ataxia and slurred speech. These reactions were probably due to the barbiturate component of the drug and disappeared shortly after withdrawal or reduction of the medication.

DISCUSSION

Although it is not intended to elaborate on the pharmacodynamic actions of the different components of plexonal some remarks seem in place.

The combination of synergistic drugs in small dosage in the same preparation has been advocated by Bürgi.[6] Its advantageous use has been demonstrated by several authors.[7] According to Bürgi the different components not only exert an additive effect but potentiate each other in their action on the target organ. In addition multiple doses following each other may be employed with less danger of sudden cumulative effects. If cumulation occurs it is more gradual and side-effects are less.

It seems reasonable to assume that the particularly good sedative effect which plexonal in our observation had on anxiety and tension states with accompanying signs of sympathetic overactivity was connected with the specific pharmacological action of the dihydroergotamine methanesulfonate in the preparation. On the basis of our observation it cannot be stated, however, whether this substance acts by potentiating the effect of the other components or whether it exerts a direct action on the target organ, the sympathetic system, or both.

SUMMARY

Plexonal, a preparation containing three barbiturates, scopolamine hydrochloride and dihydroergotamine methanesulfonate in small doses has been tried as a sedative and hypnotic on 73 psychiatric patients, both as an independent therapeutic agent and as an auxiliary tool concurrently used with other forms of treatment.

It was found to exert considerable sedative and hypnotic effect in a variety of psychiatric disorders. The best results were achieved in anxiety and tension states with marked signs of sympathetic overactivity. It is assumed that the pharmacodynamic action of the dihydroergotamine component is of importance in this respect.

Thanks are extended to Dr. George E. Reed, Medical Superintendent of the Verdun Protestant Hospital, for his valuable advice and permission to publish this paper.

REFERENCES

1. COBB, S.: Emotions and Clinical Medicine, W. W. Norton & Co., New York, 1950.
2. GELLHORN, E.: Physiological Foundation of Neurology and Psychiatry, University of Minnesota Press, Minneapolis, 1953.
3. LEHMANN, H. E. AND HANRAHAN, G. E.: *Arch. Neurol. & Psychiat.*, **71**: 227, 1954.
4. GOODMAN, L. AND GILMAN, A.: The Pharmacological Basis of Therapeutics, The Macmillan Co., New York, 1942.
5. ROTHLIN, E.: *Bull. Acad. Suisse Sciences Méd.*, **2**: 249, 1947.
6. MOLLER, K. O.: Pharmakologie, B. Schwabe Co., Basel, 1947.
7. LEHMANN, H.: *Canad. M. A. J.*, **60**: 157, 1949.

Victims of the floods in the Netherlands received Canadian Red Cross emergency relief supplies within 48 hours after the North Sea inundated their land in February, 1953.

The Canadian Medical Association Journal

published monthly by

THE CANADIAN MEDICAL ASSOCIATION

Editor: H. E. MACDERMOT, M.D., F.R.C.P.[C.]

Editorial Offices: 3640 UNIVERSITY ST., MONTREAL

(Information regarding contributions and advertising will be found on the second page following the reading material.)

Editorials

BORIC ACID—A NURSERY POISON

Boric acid is one of those "insipid" drugs which arouse little enthusiasm but continue to be used because their employment appears to have been sanctioned by tradition. The general attitude is that the drug is a mild antiseptic, and because its antiseptic action is mild it seems to be generally assumed that its toxicity is also slight. Pharmacological textbooks usually take up an ambivalent attitude towards it. Thus, Goodman and Gilman[1] say that "although it is not very toxic, serious poisoning can result". Grollman and Slaughter[2] sit just as firmly on the fence, for after stating that boric acid and borax are "only feebly toxic" they mention that "a number of cases of serious poisoning have been recorded from its absorption". They conclude, however, on a stronger note by saying that boric acid "probably deserves to be relegated to the limbo of outmoded remedies".

In the face of this mild indifference, boric acid continues to be used in large quantities, on the view that if it does no good it will at least do no harm. This attitude persists although over many decades proof has been advanced in the medical press that boric acid is really a wolf in sheep's clothing. The latest to point out the dangers of this common nursery adjunct are Goldbloom and Goldbloom,[3] who record five cases of boric acid poisoning, three of which appeared for treatment at the Children's Memorial Hospital, Montreal, within three months. In four cases, the history was one of excoriation of the buttocks due to diarrhœa in a newborn infant. Boric acid was applied to the affected parts, whereupon both the diarrhœa and the skin condition became worse. In the fifth case, the powder was applied to a weeping umbilicus, and vomiting, convulsions and abdominal and facial erythema developed. One of the cases ended fatally.

From their own experience, and from a review of 105 cases (60 fatal) recorded in the literature, Goldbloom and Goldbloom present a clear picture of boric acid poisoning which deserves study by all family doctors, since there is reason to believe that minor episodes of this condition are by no means rare and are commonly overlooked.

In the first place, it should be stressed that the risk is greatest in infancy and that poisoning is commonest from oral ingestion or application to a raw skin surface. The Goldblooms mention experiments in which soaking the feet of normal volunteers in boric acid solution did not apparently lead to absorption of the acid through the intact skin, so that presumably application of boric powder to intact skin carries little risk. Poisoning has also been recorded as a result of gastric lavage, rectal lavage, bladder irrigation, subcutaneous or intravenous infusion, empyema cavity irrigation or vaginal packing.

The commonest clinical findings are referable to the nervous system (convulsions, delirium, coma), the alimentary tract (diarrhœa and vomiting) and the skin (intense and generalized erythema followed by extensive desquamation). The last-named clinical picture is that described as Ritter's disease, and it is interesting to speculate on the possibility that this dermatological condition was a manifestation of the popularity of boric acid application to the buttocks, umbilicus, eyes and mouth of infants of a few years ago.

Where autopsy has been performed the most striking changes have been in the brain, meninges, gastro-intestinal tract, kidneys, liver and skin. Œdema and congestion of brain and meninges are commonly found, with degenerative changes in liver and kidneys, and gastro-intestinal inflammation. The finding of high concentrations of boric acid in the brain and liver has been recorded.

1. GOODMAN, L. AND GILMAN, A.: Pharmacological Basis of Therapeutics, Macmillan, New York, 1941.
2. Cushny's Pharmacology and Therapeutics, Lea and Febiger, Philadelphia, 13th ed., 1947.
3. GOLDBLOOM, R. B. AND GOLDBLOOM, A.: *J. Pediat.*, 43: 631, 1953.

Diagnosis of boric acid poisoning is not difficult, provided the practitioner keeps the possibility in mind. The acid is readily detected in urine or spinal fluid by dipping freshly prepared turmeric paper in the fluid, previously acidified with hydrochloric acid, and drying the paper in air. Appearance of a pink to red colour indicates boric acid.

No specific treatment for boric acid poisoning is known. General supportive measures (fresh plasma infusion, intravenous glucose infusion) are indicated. Any buttock excoriation may be treated by exposure to air and prevention of contamination with urine or fæces.

Considering the ease with which acute boric acid poisoning can be induced—in one case the application of the acid to excoriated skin for only two days was sufficient—there seems ample reason to support the plea for banishment of this drug from therapy altogether, or at least from the nursery. S.S.B.G.

Editorial Comments

MULTIPLE TWIN BIRTHS

We publish in this issue a report by Dr. J. A. Bergeron of an instance in his practice of six pairs of twins in one family. Multiple twin births, if not common, are at least well known, but Dr. Bergeron has thought that in some respects this series is worthy of record. The literature does not contain many such well documented instances of multiple twin births, certainly not in such close succession and in such a short time. Several much larger families, containing twins, triplets and quadruplets are recorded, but an almost unbroken series of twins is rare indeed. Even when multiple births are mentioned in the literature there is a lack of such exact detail as one would like to have, and Williams[1] speaks of one such very large number of births as apocryphal. Neugebauer[2] quotes some instances from the literature of multiple births of astounding proportions, particularly of Mary Austin who, in 33 years of married life, is said to have borne 44 children—13 pairs of twins and 6 sets of triplets. She also seems to have found time to be a doctor. Neugebauer also refers to Boer's case of a Viennese woman who had 32 children in 11 births. But others were frankly sceptical about this last report, and the oft-quoted case of Mary Austin already mentioned could not be confirmed by Greulich,[3] who himself gives a fully detailed account of six pairs of twins in one family. But these last again were not as nearly consecutive as in Dr. Bergeron's report, but had three single births interspersed. Another case, though lacking detail, is reported by Bland[4] of a woman who bore 28 children at full term, only two of whom were born singly: there were several pairs of twins, two or three sets of triplets and one set of quadruplets.

It may be of interest to quote from *L'Union Médicale du Canada* of 1895 (Vol. 24, p. 330) the following comment on "La fecundité de la race canadienne".

> "The Province of Quebec is not quite unpopulated, and Malthus would receive no great welcome here. A recent Provincial order in council has decreed that 100 acres of government land will be granted to each family with twelve living children of legitimate birth. Up to date, 174,200 acres of good farming land have been granted to 1,742 heads of families with more than twelve children fulfilling the conditions, and everyone is not yet satisfied!
>
> "Families of twenty children and more are not rare, and their heads are claiming their due reward for their patriotic efforts. A M. Paul Belanger of Rivière-du-loup has claimed for not less than 300 acres, on the ground that he has 36 living children. M. Theoret of Sainte Geneviève acknowledges a mere 17 children, but his wife is only thirty years old, and in this short time has already borne two sets of triplets and three pairs of twins. If she continues at this rate she will soon own the Province of Quebec itself!"

1. Textbook of Obstetrics, 7th ed., p. 501.
2. v. NEUGEBAUER, F.: *Zentralbl. f. Gynäk.*, 37: 1061, 1913.
3. GREULICH, W. W.: *J. A. M. A.*, 110: 559, 1938.
4. BLAND, D. W.: *J. A. M. A.*, 13: 467, 1889.

DR. J. C. MEAKINS RECEIVES HONOUR

We note with great pleasure the selection of Dr. J. C. Meakins for the reception of the Mental Health Award of $1,000. This award was established about three years ago by an anonymous donor in recognition of outstanding work in the promotion of mental hygiene in Canada. The first award went to Dr. C. M. Hincks three years ago for his work as executive director of the Canadian Mental Health Association. Dr. Meakins, as president of that Association, has been extremely active in developing divisions of the Association throughout Canada, with particular emphasis on lay support, and this award which is presented through the Mental Hygiene Institute of Montreal will meet with widespread approval. Dr. Meakins is a past president of our own Association and, in spite of his retirement from teaching and hospital work some years ago, has remained active and vigorous in many fields. This award is appropriate recognition of his contributions in the sphere of mental health.

Canad. M. A. J.
April 1954, vol. 70

FIFTH INTERNATIONAL CONGRESS ON MENTAL HEALTH

An event of great significance and one which testifies to our national maturity is the Fifth International Congress on Mental Health which will be held in Toronto, August 14-21, 1954. The theme of the Congress is Mental Health in Public Affairs, a topic worthy of the attention of all good citizens. As one of the organizations sponsoring and endorsing the International Congress, the Canadian Medical Association desires to commend the Canadian Mental Health Association for its work in preparation for this important gathering.

It will be apparent to Canadian doctors that psychiatry has assumed a status as a field of special medical practice which it did not previously enjoy. The viewpoint of psychiatry is now listened to with greater respect than ever and there has been increasing medical recognition of the profound effect of the psyche on the soma. This is evident not only in medical circles, but, of course, among the intelligent public as well. The contribution made by psychiatrists and psychologists to the problems of personnel selection during wartime and the demonstration of the substantial aid which they could render to doctors confronted with clinical problems, was most effective in promoting a change of attitude. The emergence of many psychiatrists from mental hospital work to private practice and the establishment of psychiatric departments in general hospitals were a logical outcome of the wartime experience.

The stimulus of the Mental Health Grants should not be lost sight of, as this financial assistance has permitted the more rapid development of mental health services. Aid to the practising physician who is located at a distance from a medical centre by the provision of travelling mental health clinics has been increasing, and the appointment of district psychiatrists in certain areas has done much to bring early assistance to many patients who would otherwise be potential candidates for admission to a mental hospital at a later stage of their disease.

These developments have all been in the direction of providing psychiatric service to patients much earlier than formerly, of applying preventive methods and demonstrating that psychiatry is not an esoteric art but one which is integral with medical practice.

For the future it would appear that psychiatry should increasingly apply the techniques of research and experiment which have been so fruitful in other fields of medicine, in the hope that new knowledge will provide fresh approaches to treatment of the psychoses. The ageing of the population presents an opportunity for further study of the mental health needs of people in the late decades and it is hoped that the next ten years will show progress in this area. Finally, extension or consolidation of the advances made in applying psychiatric knowledge to the clinical problems of the general practitioner should be a project for the immediate future.

A.D.K.

BAT RABIES

The existence of rabies infection in bats of the United States was unknown until June 1953, when it was diagnosed by the Tampa regional laboratory of the Florida State Board of Health. The first bat found to be infected was a Florida yellow bat (*Dasypterus floridanus*), which had been killed while attacking a seven-year-old boy. Diagnosis was established by the presence of Negri bodies on microscopic examination and was confirmed by inoculation of mice with the bat brain. The virus was isolated and confirmed as rabies virus by neutralization and by complement fixation tests. Subsequently, rabies virus was found in Florida in the brains of five yellow bats and one Seminole bat (*Lasiurus seminola*), which were apparently normal and had been killed in flight while feeding. Both specimens are insectivorous and indigenous to the southeastern United States.

In September 1953, rabies infection was recognized in a bat which had made an unprovoked attack upon a woman in Pennsylvania. The brain was examined and positive evidence of rabies was found. The diagnosis was confirmed by the inoculation of rabbits. The woman was given Pasteur treatment and has remained healthy to date.

In Latin America, bat rabies has existed for half a century. The designation "bat rabies" is used in the absence of better terminology for that form of rabies which is transmitted by bats and usually occurs in humans and livestock as paralyses. The existence of rabies among bats was first recognized in Brazil during investigations of a paralytic disease among cattle, which had appeared as an epizootic in 1908. In 1916, rabies virus was isolated from a fruit-eating bat (*Phyllostoma superciliatum*) caught while biting cattle during the daytime.

In 1929, an epidemic of ascending paralytic myelitis in humans in Trinidad was found to be caused by the virus of rabies. During this epidemic, authentic accounts were given of bats flying from fruit trees and attacking humans and animals. In 1936, results of investigations were reported showing that vampire bats transmit rabies in humans and livestock.

In Mexico, bat rabies was recognized during studies of a highly fatal paralytic disease of livestock. Between 1939 and 1943, there were at least

*Based on a paper by Robert D. Courter (*Pub. Health Rep.*, 69: 9, 1954).

10,000 cases in cattle every year. Rabies virus was isolated from the salivary glands and brain of a paralyzed cow and from the salivary glands and brains of vampire bats (*Desmodus rotundus murinas Wagner*) in the area of the disease. Dogs did not appear to be associated with its transmission. In 1953, bat rabies was reported to occur in several parts of Mexico.

The rabies virus isolated from bats has been shown by pathological findings, animal inoculation, complement fixation, cross neutralization, and protection tests to be closely related to classical strains of rabies virus. Pawan demonstrated that the Trinidad virus travels readily to the salivary glands in bats; the saliva sometimes becomes highly virulent as early as seven days following subcutaneous inoculation, while the bat itself may manifest no sign of disease.

B.L.F.

LADY RODDICK

We note with regret the recent death (on February 16) of Lady Amy Redpath Roddick, widow of the late Sir Thomas Roddick, to whom the profession was indebted for the formation of the General Medical Council of Canada. In his memory Lady Roddick presented the memorial gates and clock at the entrance to McGill University. This was only one of the many acts by which she showed her keen public spirit. She interested herself particularly in the Canadian Indian, taking special interest in the welfare of the Caughnawaga Reservation, being formally admitted to membership of the Iroquois and receiving the title of "Princess". Lady Roddick was a prolific writer, both of prose and poetry, and was a patron of the Women's Council of Canada; a life member of the Art Association of Montreal; a member of the Canadian Authors Association; and of the Canadian Women's Club.

Dignified and retiring in nature, she still was closely associated with many philanthropic activities, and with her death another link with the medical past is broken.

ERRATUM

Stratford General Hospital

In the list of Commended Hospitals, pages 103-104 (Adv.) of the November 1953 issue, Stratford General Hospital should be shown as having "Required" Out-Patient and Emergency Service. This was left blank in error.

Men and Books

ALBERT SCHWEITZER, PHYSICIAN*

S. G. ROSS, M.D., *Montreal*

AT RARE INTERVALS in our history there appear men of multiple talents—talents which they develop to their utmost—men such as Aristotle and Leonardo da Vinci. These men have left an imperishable record in the history of human progress. Today I solicit your interest while I speak briefly about a contemporary man of many talents. This man is Albert Schweitzer, physician in French Equatorial Africa for the past forty years. In addition, a world famous organist and interpreter of Bach, an authority on organ construction, ethical philosopher and theologian, whose studies of Jesus and St. Paul and the philosophy of civilization have disclosed his profundity as a thinker. How has he compressed all these accomplishments into the space of a lifetime and what imprint has he made on civilization?

Naturally, my remarks will deal with his work as a physician in Africa, but for a clear understanding of this it will be necessary to focus it in relation to his early life and other achievements.

Schweitzer was born in 1875 in a small village in Alsace. The son of a Protestant pastor and the grandson of another on his mother's side, he grew up in a religious atmosphere. At the age of six months his father settled in Gunsbach as pastor, and this was his home until his death. His church was unusual in that it served both the Catholic and Protestant families of the community. During the reign of Louis XIV when Alsace became French, that monarch decreed that in every Protestant village in which there were at least seven Catholic families the chancel of the church should be given up for their exclusive use. Thus, in many churches of Alsace up to the present this custom holds. Schweitzer states that even as a child he felt beauty in the idea that Catholics and Protestants worshipped in the same building. It became a symbol of tolerance and an exhortation to future religious unity. This feeling has persisted throughout his life.

At a very early age Schweitzer showed a love and talent for music, and by the age of eight had begun to play the organ. He continued his musical education concurrently with his other studies and, as is well known, developed into a world famous interpreter of Bach. His mastery of the organ was to serve him in an extraordinary way in later life.

---

*An address delivered on St. Luke's Sunday, October 18, 1953, at St. George's Church, Montreal.

Canad. M. A. J.
April 1954, vol. 70

Certain characteristics manifested themselves in childhood. He had an innate respect for life, not only human but all animal and even plant life. The preservation of life became a primary motivating factor of his existence. Cruelty was abhorrent to him. Side by side with this was an intense love of nature, and he recalls with delight his two-mile walk to and from school daily through the woods.

Schweitzer's education, apart from music, was carried out first at Mülhausen and later at the University of Strasbourg. He was attracted by history and science, but found languages and mathematics difficult. It is a commentary on his will power that he felt a certain fascination in mastering subjects for which he had no special talents. So he gave the greater effort to the difficult subjects. This evidence of will power was manifest in later life in his ability to control all bodily desires and mental habits.

At Strasbourg he studied theology and philosophy, as well as continuing his studies at the organ. He took degrees in both theology and philosophy. Theology had the greater attraction and in 1899 he obtained a post as curate in the Church of St. Nicholas. He was also appointed to a teaching post in the Faculty of Theology. The next five years was a fruitful period. In theology he was carrying out research on the lives of Jesus and St. Paul. He was also working in philosophy on the ethical problems of civilization. Meanwhile, his musical fame increased, and he also conducted research into organ construction.

At this period of his life, with his future assured, Schweitzer deliberately made a decision which altered the whole future course of his life. This was no sudden decision. As a student in school and later at the University, while enjoying the happiness of being able to study and carry out research in science and art, he meditated continually on the contrast between his life and that of others who were unhappy through poverty or ill-health. This weighed on his conscience to the extent that he made a momentous decision. He would continue the present life, with its manifest interests and accomplishments until the age of thirty. At that time he would sacrifice his career and take part in some direct human service to humanity. The significance of the time chosen—at thirty years of age—cannot be missed. The sacrifice would be threefold. It would require, firstly, that he abandon the organ and music, secondly, that he renounce academic teaching and research, thirdly, that he lose his financial independence.

What form his sacrifice would take did not become apparent at once. Numerous possibilities were considered, only to be rejected. The answer came in the year 1904 when he came upon an article by the Paris Missionary Society discussing the needs of their Congo Mission. Here was the answer. He decided to study medicine, in order to go as a doctor to Equatorial Africa. This surprising decision naturally met with great opposition from his friends. His many talents would be wasted in an unfavourable environment. If he still insisted, why go as a doctor instead of a missionary? His training for this was complete whereas it would require long study to become a physician. His answer was that he preferred to go as a doctor so that he might be able to work without having to talk. Words no longer sufficed. He must put his religion into practice.

The decision made, Schweitzer settled down in Strasbourg Medical School for the long grind. But he could not make a complete divorce from his former life, so he continued his pastorship, his theological teaching and his music throughout his course. Only his marvellous physique and his iron will allowed him to lead such a life. He completed his medical education in 1912. In the same year he married Helen Bresslau, the daughter of a Strasbourg historian. She was to accompany him to Africa.

He now proposed to the Paris Missionary Society that he would establish at his own expense a small hospital at Lambaréné, a mission station in Gaboon in French Equatorial Africa. This was accepted. Friends of his contributed money and he devoted his earnings from organ concerts and his book on Bach as well. His hospital was to be completely undenominational and international, as he felt strongly that all humanitarian work should be done on this basis.

The Schweitzers left Gunsbach on Good Friday, 1913. A few days later they sailed from Bordeaux. On April 14 they reached Cape Lopez, where they transferred to a river steamer which took them up the Ogowé river to Lambaréné. As the building which had been promised him by the Mission had not been erected owing to a labour shortage, he had to use an old fowl-house for his consulting room, it being the only available shelter. From the first few days he was besieged by sick people. The chief complaints of the natives were skin diseases of various sorts, malaria, the sleeping sickness, leprosy, elephantiasis, heart disease, pneumonia and tropical dysentery. Among the minor ailments scabies was a source of great discomfort and distress. This was one of the diseases which the late Sir Arthur Shipley included in his book entitled "The Minor Horrors of War", which he wrote during the first World War. Fortunately, the treatment was simple and effective.

Later, he began to practise simple surgery. One of the commonest surgical emergencies was strangulated hernia. The pain in this condition is intense, and Schweitzer describes the joy he experienced in operating on such cases and observing the immediate relief of pain.

During his first nine months Schweitzer treated about two thousand patients. In addition to tropical diseases, he found that most of the European diseases were represented, although he states that cancer and appendicitis were not seen. Sleeping sickness presented a difficult prob-

lem, as the diagnosis required microscopic examination of the blood and took precious time. It was vital to make the diagnosis in the early stages, because only at that time could one expect recovery if treated.

Building a hospital was the immediate need. For this, ground must be cleared, building material obtained, and finally workers must be recruited. He found that the natives were "magnificently lazy", as he put it, and worked only under white supervision. He himself frequently took part in the manual labour required for the enterprise. The personal example was essential. With the help of several white men from the Mission the hospital was erected that autumn. With the aid of his wife, who acted as nurse and anæsthetist, and some native orderlies, a working team was established.

As the hospital was situated on the Ogowé, which is a large river with many branches, patients began to come from far distances by canoe as the fame of the new doctor spread. As far as was possible, the natives who brought the patient were put to some useful work while at the settlement.

Lambaréné was practically on the Equator. The heat was intense, particularly as the heavy virgin forest came right down to the banks of the river and allowed very little breeze to penetrate to the hospital. Dampness was extreme and made it difficult to protect medicines. As a result of the climate, white people usually could not remain for more than two years without leave. They usually suffer from tropical anæmia which produces great fatigue. Strangely enough, Schweitzer maintained his mental freshness in spite of the fatigue and the sweating heat of the African jungle. Fortunately, he had brought to Africa a piano with pedal attachment which had been presented to him by the Bach Society of Paris. With this, he was able to continue his organ practice to his great joy, and the voluntary sacrifice of music was not required. He was also able to give several hours after supper, if not too exhausted, to his study of ethics and civilization as a part of the history of human thought. I quote his remarks on the problem of the white man in the tropics:

> "Mental work one must have if one is to keep oneself in moral health in Africa, since the man of culture, though it may seem a strange thing to say, can stand life in the forest better than the uneducated man, because he has the means of recreation of which the other knows nothing."

During his stay in Africa, Schweitzer soon came to realize that interests of native civilization and European colonization did not always coincide. The utilization of the natural resources of the country, of which the most valuable was the native timber, required native labour. This withdrew the native from his local villages and plantations. As a result, the social and economic life of the village was disrupted, food production decreased and the plantations in which the staple foods were grown relapsed into jungle. The native labourers in the timber camps had to live on imported food, as their ordinary foods such as manioc, bananas and fish could not be stored. Traders brought in useful articles such as clothing and tools, but also many unnecessary ones, and also a great deal of spirits which caused much drunkenness. As a result the natives spent most of their money and returned to their villages penniless. In the meantime, village life had deteriorated, and often starvation or semi-starvation resulted. Year by year the native population diminished. Schweitzer felt that the exploitation of the native population was one of the main problems of colonial administration in Africa.

Time does not permit a more detailed description of the first four and a half years spent at Lambaréné. On account of the war, leave to Europe was impossible. He was, however, able to spend the rainy season at the sea during the last of these. Otherwise, it would have been impossible to carry on. In 1917 the French Government ordered that the Schweitzers should be taken to France and placed in an internment camp. Here they stayed until the next summer, when they were exchanged and returned home. Schweitzer was in a poor state of health, as a result of chronic dysentery, and required prolonged treatment before recovery.

We cannot detail the later events of Schweitzer's life, including his four years in Europe where his fame was universally recognized. He continued his Bach concerts and gave lectures on philosophy and religion in many countries. However, in 1923 he returned to his work in Africa, leaving all the amenities of civilization, only to find his hospital in ruins and the jungle taking over again. So Schweitzer had to set to work in a dual capacity as physician and as master builder in the work of rebuilding the hospital. He did his medical work in the morning, and in the afternoon joined the natives in construction work. Meanwhile, other volunteers arrived from Europe, including another physician, and later more physicians and nurses. However, at this time a terrible epidemic of dysentery developed. Cross-infection among the patients was rife, and as expansion was impossible on the present site, it was decided to move two miles up the river and build a new hospital with plenty of room for future expansion. Having now three doctors on his staff, Schweitzer gave up medical work, and for a year and a half became foreman of construction. Without his personal authority and example it was impossible to keep the work progressing satisfactorily. As he remarked, "It was while I was foreman of a troop of workmen hewing down trees that the news reached me of the Philosophical Faculty of the German University of Prague having conferred upon me the honorary degree of Doctor." When the hospital was completed in 1927 it provided for two

Canad. M. A. J.
April 1954, vol. 70

hundred patients. Adequate provision had been made for the isolation of infectious patients and mental cases. Dr. Schweitzer still carries on his work in Africa, but makes more frequent visits to Europe.

What has been the effect of Schweitzer's African adventure upon the man himself, upon the native population, and upon the world in general? One might say that he has put to a practical test his ideas on philosophy and religion. He was a sincere believer in the value of the thinking individual. He saw the danger in modern civilization of mass acceptance of ideas forced on the individual by dictatorship or popular movements. Blind acceptance of authority in religion, as in all other human intellectual activities, did not satisfy him. He felt that the will to live was a fundamental truth. The hypothesis of certain religious and philosophical systems, namely, that life runs its course in space and time and is purposeless, was repugnant to him. If such were accepted, the sensible attitude of man would be to die to the world and life. Schweitzer felt that the most immediate act of man's consciousness was the assertion—"I am the life which wills to live in the midst of life which wills to live." After long pondering on this subject the phrase "Reverence for Life" suddenly flashed through his mind. This seemed to be the complement to the "will to live". There must be reverence for all life which had the will to live. The ethic of Reverence for Life, therefore, "comprehends within itself everything that can be described as love, devotion and sympathy, whether in suffering, joy and effort." He felt that this was the ethics of Christianity.

With his doubts cleared away, Schweitzer had the joy of carrying out in a practical way this ethic of reverence for life. For this purpose he had made his sacrifice and found his reward. The thousands of under-privileged humans whose lives were saved, who were restored to health, or whose pain and discomfort were relieved, bore witness to his efforts. Through his simple religious teaching, Christianity became for the negro a shining light amid the darkness of his fears. It assured him that he was not in the power of native spirits, ancestral spirits or fetishes, and that no human being had any sinister power over another. Schweitzer also felt that he was making some atonement for the wrongs perpetrated by white civilization upon the black continent.

To the world Schweitzer has become a symbol —a symbol of high endeavour in which his manifold talents have been utilized to the full; a symbol of the sacrifice of one's personal career in order to atone for wrongs done to humanity; a symbol of the feeling of responsibility which one should have towards one's fellow men, particularly the unfortunate; and, finally, a symbol of practical Christianity free from dogmatism of which the world today stands in such pressing need.

MEDICAL ECONOMICS

ECONOMICS OF PRIVATE GROUP PRACTICE

C. RUFUS ROREM, Ph.D., C.P.A.,*
Philadelphia, Pa.

THE INDUSTRIAL REVOLUTION in manufacture and trade was characterized by the development of specialists whose knowledge and efforts were co-ordinated by others skilled in the art of enterprise. Medicine appears to be entering a similar phase, with a form of self-co-ordination generally known as group medical practice. Private practitioners are seeking methods by which they can effectively pool their comprehensive knowledge and individual skills to more effective diagnosis and treatment of patients.

GROUP PRACTICE DESCRIBED

Group practice in many forms has become an established fact in North America. Examples are: the sharing of office space by individual competitive physicians; the conferences by doctors in their respective offices or patients' homes concerning a specific patient; the discussions on hospital wards concerning charity cases assigned to "staff service"; the organized out-patient departments of hospitals; the private medical groups established by physicians as a means of professional service and personal livelihood. Many doctors, therefore, have been engaged in group practice without realizing it, just as Molière's bourgeois gentleman discovered he had been speaking "prose" all his life without knowing that he was doing so.

This discussion will be limited to medical groups owned and controlled by physicians in which several doctors, sometimes as few as three, and rarely 100 or more, pool their investment, expenses and income for the care of private patients. Many such "clinics" have 10 or fewer physicians, and most of the participating doctors are on a full-time basis. There is a definite concentration of private clinics in the Western States and Provinces. The majority are in cities of 25,000 or less, which is not surprising since there are more small than large cities. But, even proportionately, more doctors have formed private clinics in small cities than in large metropolitan areas.

Each group includes different medical specialties in its membership, and possibly general practitioners. A majority of the physicians are on a full-time basis and receive a substantial portion of their personal incomes from

*Executive Director, Hospital Council of Philadelphia.

professional work with the group. In the treatment of patients, the doctors co-ordinate their professional services. They are not competitors with each other, but part of a single organization.

Each patient's financial transactions are with the group as a whole, whether he is served by one physician or several of them. The income of each doctor is determined, at least in part, by contractual arrangements with others in the group, rather than charges determined by himself for his personal services to individual patients.

The professional services are directed primarily toward the effective care of patients. Medical education or research may be a collateral activity. Administrative and financial matters are handled by a business manager, that is, a specialist in these fields of activity.

FACTORS OF SUCCESS AND FAILURE

The organizers of private medical groups have usually been prompted by motives of enlightened self-interest rather than professional or social reform. The specific objectives have been personal convenience, financial economy, improved service to patients, and better professional opportunities.

Private clinics which have been discontinued always record the same history. Patients were plentiful. The quality of care was reasonably good. Total income was adequate. But the participating physicians were not able to agree upon the division of the earnings. The disagreement may have resulted from the fact that the group was very small, without an opportunity for the member-physicians to recognize their professional and financial interdependence. Or it may have been caused by the death or resignation of a strong leader who had organized the group and exercised a great influence upon the other members who were more or less subordinate to his will. In the absence of such leadership, the remaining members could not agree upon a formula for professional and financial co-operation.

LOCATION, EQUIPMENT AND ORGANIZATION

The physical form and location of private clinics do not follow a uniform pattern. Some groups are located in office buildings, others construct their own quarters, still others occupy space in community hospitals or hospitals which they own and administer. Many clinics are "down town", others in the residential districts. The exact locations have been determined by such factors as available space, proximity to hospitals, concentration of previous practice of the physicians, and the extent to which cases are "referred" by other doctors.

The amount of scientific equipment required also varies; it depends upon the alternatives available. Nearly all groups own their x-ray apparatus; a few use the services of a radiologist in an adjoining office. Some physicians perform minor operations at the clinic; others do not. The need for equipment is influenced by the ease with which consultations and diagnostic procedures can be carried on at hospitals. The proportionate maintenance expenses for waiting, consultation, examining, treatment rooms and laboratories tend to be less (per clinic doctor) than for individual specialists in the same community.

Most private clinics are legal partnerships, although it has often proved desirable for a separate corporation to be organized for the ownership of plant and equipment. The partnership pays an annual or service rental for buildings and apparatus. This arrangement tends to simplify the personal bookkeeping for the doctors, as well as to establish limited responsibility for the stockholders in the corporation. A few private medical groups are organized as corporations. In these cases, the member-physicians are still responsible for their professional acts in relationship with patients.

PROFESSIONAL MEMBERSHIP

Physicians do not usually hold equal rank within a private medical group, from the standpoint of authority, ownership, or income. Three types of physician membership are present, to greater or lesser degree, in the various medical groups.

"Senior Partners" include the older men and those who have provided the original financial investment. They are the "owners" of the clinic, and are the department heads. They often comprise the executive committee for decisions on financial and administrative matters, such as employment of new staff, promotions, or sale or lease of buildings or equipment. Senior partners normally would receive larger incomes than other physicians.

"Junior Partners" are doctors who have served for several years and who are permitted to make some investment. They may receive, in addition to their salary, adjustments based upon volume of work from year to year, and a portion of any "profit" available after salaries, commissions, interest, and dividends have been paid. Junior partners may also participate to a limited degree in the determination of policies.

"Employee physicians" are those who are engaged for periods of two or three years until it can be determined whether they are suitable temperamentally and professionally for a permanent connection. The employee-doctors ordinarily do not share in any bonuses for volume of work, although their salaries may be increased during the trial-period.

There is no single perfect method for distribution of income. All the economic factors of wages, interest and profit are involved. Payment of interest on loans presents no special difficulty.

Canad. M. A. J.
April 1954, vol. 70

Likewise, the establishment of reasonable dividends upon invested capital can usually be agreed upon with a minimum of misunderstanding. But the problem of reimbursement of physicians for their personal services is less easily solved. Nearly all private clinics establish a basic "drawing account" for each physician. These are influenced by such factors as a doctor's experience, type of specialty, and length of service. Special bonuses may be declared in accord with each doctor's personal services, as measured by total consultations, examinations or treatments, as well as new patients directly traceable to his personal membership in the group.

FEES TO PATIENTS FOR SERVICES

Fees charged to patients by private clinics tend to equal the prevailing rates charged by other physicians in each community. Variations from this rule generally reflect the individual doctor's prestige or the financial situation of the patient. Underlying the establishment of fees are three separate but interrelated factors, namely: cost of production, professional benefit, and ability-to-pay.

The cost-of-production principle is particularly suitable for such items as laboratory procedures, physiotherapy and some forms of roentgenology (particularly routine chest x-rays). Pricing technical procedures at "cost" tends to separate them in the patient's mind from the advice and services of the medical practitioner.

Clinic management can make an estimate of the value of the time devoted to a specific procedure by a salaried doctor. But are all the minutes or hours of a doctor's time of equal value? Does it "cost as much" to spend 30 minutes in the consulting room as the operating room? None of the theories of cost-allocation in the accounting textbooks can be applied with confidence to analyses of the cost of personal services of a physician.

A private group may occasionally apply the "benefit" theory, particularly where a series of tests or treatments have proved of doubtful value to the patient. A "regular" fee will be greatly reduced because of the uncertain or negative value of the service. If a positive result is obtained early in the course of management, the charge may be as high as if work had been completed. The benefit-theory admits the patient to partnership in the adventure of discovery and recovery. Any patient would appreciate special tempering of the fee for an ineffectual service. He would have little complaint if he were cured more promptly than was expected. This does not imply that a patient should always be taken into the doctor's confidence with respect to matters involving clinical judgment. But adjustment of charges according to the value received by the patient cannot possibly injure the practitioners from the professional or financial viewpoint.

Ability-to-pay has long been the basis of medical charges, and still characterizes the fees assessed against most patients of private clinics. Ability to determine ability-to-pay is more likely to be found among the personnel and methods of the business office.

Why have private clinics not grown more rapidly?—If medical group practice is potentially good for patients and doctors, why has it not grown more rapidly among private physicians? Several reasons may be cited.

The physician has been educated and trained to dominate each situation in which he appears. It is easier for him to be master of his own house than to adapt his work to a group of professional equals. When several doctors work together, some of them must be administratively superior to the others, even if this dominance shifts from one to another with specific problems and tasks. A doctor's training in the analysis and study of symptoms places little emphasis upon problems of management and organization. Many physicians present a psychological resistance to "group" action, even though it would be economically sound and professionally desirable.

There is a scarcity of business ability available for the organization of private medical group practice. The potential organizers are also the successful individual practitioners, who have little personal reason for initiating and maintaining a group for medical practice. Individual practitioners in some communities have opposed the formation of groups by those who wished to do so. Their viewpoint influences the action of medical societies, many of which have exhibited open hostility to private clinics.

A final very important reason why physicians are not forming a large number of private groups is that "they do not have to". Many of the professional and economic advantages sought in group practice have become available through the hospitals in each community.

The personal relationship and free-choice.—Group medical practice must recognize the necessary "personal relationship" between physician and patient. A patient's need is "personal," and his trust in a physician must be wholehearted and unreserved. Unless he tells the whole truth and follows instructions implicitly, diagnosis or treatment may be greatly hindered. The patient is a person, not a disease. The doctor is a person, not a machine. The personal relationships necessary during consultation with specialists (most of whom the patients are meeting for the first time) can be established with the help of a doctor in a group more easily than by cards of introduction in the crowded waiting-rooms of busy independent specialists.

Freedom of choice of one's doctor is often very important to the peace of mind of the patient. The patient wants a "good" doctor in whom he has confidence. This confidence can be developed from personal experience by the patient or some friend or acquaintance. A satisfactory experience with a doctor, individually or

in group practice, will develop such confidence. An unsatisfactory experience will destroy it.

Speaking as a layman, I believe that selection of a specialist should seldom be attempted by the patient. There is too great a possibility of selection on the basis of a reputation that may be irrelevant to the patient's need. The chance of wise selection would be enhanced by placing the responsibility in the hands of a physician familiar with the patient's condition.

What group practice offers the physician and patient.—Time is money. If a patient needs to consult several doctors, he will find it more convenient to do so at one address. It is sometimes said that medical groups tend to perform unnecessary services for patients merely because the facilities are convenient and the doctors are accessible. These are rather good reasons from the patient's point of view. A few minor diagnostic procedures might occasionally reveal some very important facts, and they can be performed with a minimum of time and effort by a medical group.

Health conservation is an important but elusive goal. The apathy of the public with respect to regular physical examinations has its counterpart in the lack of enthusiasm on the part of the medical profession. Prompt diagnostic service is a form of prevention that can arouse and sustain the interest of both physician and patient. It can be achieved promptly and economically when the specialists are working in each other's presence and are free to consult without undue formality or delay. Not every illness requires the services of an experienced specialist, or the intimate understanding of a family doctor. In such situations, the medical group may use the services of younger and less experienced physicians. Patients are treated well because the younger doctors are supervised by their older colleagues. The young doctors grow in wisdom and skill without undue risk on the part of the patients who come under their supervision.

Group practice permits the proper and full-time use of young physicians. A young doctor in competitive practice often spends a great deal of time waiting for patients. The reciprocal of the young doctor's entrance into medical practice is the older physician's retirement. Group practice gives maximum opportunity to perform services requiring judgment and experience, while "tapering off" on work that might involve manual dexterity and personal energy.

Group practice is adaptable to general medical service and performance of the role which has been played by the family doctor. A medical group which serves the general community, in contrast to referred cases only, certainly should use the services of general physicians to maintain continuity in the contacts with individual patients. Patients often have come to think of a specific clinic physician as "their doctor". The personal relationship is not destroyed by the fact that other physicians are located in the same office. General physicians in a group may perform the special function of co-ordinating findings in a comprehensive diagnosis. These physicians establish the initial contact with a patient, direct him to various specialists, and discuss results with him along with a program of treatment and care.

Some groups have a staff of general physicians, often young men whose responsibility is to treat minor ailments at the clinic and in the home in much the same way as general practitioners have done for generations. Some of the general practitioners may even retain occupancy of their private offices, conducting them as branches of the central medical groups. In this way patients and physicians retain ease of contact for the care of minor ailments, with the assurance that specialized equipment, knowledge and skill may be utilized when necessary.

What about doctors on salary?—Early in this paper it was implied that medical group practice uses to a relatively high degree the "salary" principle as the basis of reimbursement. What does this do to the quality of medical service and to professional incentive? Several years ago, I made it a practice to ask every physician whom I met in connection with my work the following question: "What do you think of the suggestion that all physicians should receive a regular salary?" The replies were always the same, namely "What amount of salary did you have in mind?"

An adequate salary should encourage a conscientious physician to do more thorough work than otherwise. The fee-for-service basis of charge is the professional equivalent of the piecework system in industry which serves as a speed-up device for manual workers. The analogy is not entirely complete, because the medical fee is permitted to vary with the customer. But even here the analogy may be more correct than flattering. Does it require more time to examine the throat of the local banker than an indigent client? Strictly speaking, the amount of time required should be determined by the probability of infection, rather than the probability of collection.

What about professional incentive? My observation leads me to believe that some of the hardest working people are the salaried members of professional and industrial groups. A good salary should be the answer to the wish often expressed by physicians that they would like to be free to practise medicine in terms of each patient's need for service.

One of the great dangers in a salary arrangement is that which attends any business contract, namely, that the employer will fail to recognize the special contribution of a superior person, or that he will offer such low salaries that only inferior applicants will accept or con-

Canad. M. A. J.
April 1954, vol. 70

tinue in the positions. Government agencies and universities have been particularly guilty of the practice of paying low salaries. The result in the past has been that qualified physicians in government work have either left their posts or reduced the amount of thought and energy devoted to their tasks. As to universities, the low salary has been defended on the ground that a teaching appointment enabled the professor to charge higher fees and to develop a more active practice. This latter policy has been a sordid boon to the honoured professions of medicine and teaching.

Group practice and group payment.—Emphasis has thus far been placed upon group medical practice as an economical method of producing good service. No specific mention has been made of the problems of group-payment by the actual or potential recipients of medical service. Group-payment and group-practice are related matters, but they are distinct in their objectives and procedures. Each is derived from the individual's eternal quest for certainty in matters of health. Two forms of uncertainty face an individual when he becomes sick; namely: how much his illness will cost, and whether he will recover.

The uncertainty of cost can be removed through group action such as insurance or taxation. Health insurance is here to stay. The question is whether health insurance plans will be developed rapidly enough by medical leadership to avoid the establishment of burdensome government control. Certainty of recovery can never be achieved. But physicians can assure the patient that all available medical knowledge and skill will be directed to that end.

CONCLUSION

North America has more well-trained physicians and subsidiary medical personnel than any other part of the world. We also have more hospitals and scientific equipment for prevention, diagnosis and treatment. But the need remains for professional personnel to be co-ordinated adequately so that knowledge, skill and equipment can be utilized for the greatest good of the greatest number.

Group practice by private physicians is, of course, only one phase of a complete health program. The costs of medical care should be met through group action by the public through appropriate uses of insurance and taxation, balanced in such manner as to place the burden equitably upon those best able to pay and most likely to benefit, directly and indirectly, from adequate personal health service.

Medical service by physicians should be co-ordinated with that of dentists, nurses, public health agencies and hospitals, as well as education of the general public. Personal health is affected by employment, nutrition, recreation, and housing. Availability of medical care cannot offset difficulties arising from irregular work, insufficient food, improper living conditions or inadequate clothing. But prompt treatment by or under the direction of qualified physicians can do much to maintain a high level of personal health in North America.

Medical and hospital service should be co-ordinated within each institution, and throughout each community. Through such co-ordination, the people will receive maximum value from facilities which they have created and from the knowledge and skill of the medical profession.

GENERAL PRACTICE

THE COLLEGE OF GENERAL PRACTICE OF CANADA

M. R. STALKER, M.D., *Ormstown, Que.*

AT THE CANADIAN Medical Association Convention at Winnipeg in June 1953 a committee of seven was appointed by General Council to do all things necessary to form a College of General Practice of Canada. The aims and objects, provisional rules and regulations, the officers and members of House of Representatives have been published in December, January and March issue of the *C.M.A. Journal* and *l'Union Médicale*. The other six members of this Committee have now asked me to make a report to the profession of Canada. I should like to think that in doing this I was speaking to each and every physician in Canada.

It is six years since Dr. Wallace Wilson, Past-President of the C.M.A., realizing the unrest within the ranks of the general practitioners asked Dr. Victor Johnston to call and chair a meeting at the annual meeting in Toronto. This meeting was very largely attended and there was a strong and definite expression of opinion that some action should be taken. The Section of General Practice was founded and throughout the succeeding years representatives from the ten provinces have been meeting at least twice each year, with a very active executive working throughout the year. At each convention a general session of the Section was held and a report made each year to General Council. In 1952, General Council set up an exploratory committee to study and bring in a report. This committee held meetings with representatives of district and divisional sections of general practice across Canada, the Canadian Hospital Council, the Catholic Hospital Council, the Association of Canadian Medical Colleges, the Royal College of Physicians and Surgeons of Canada, the American College of Surgeons, and the American

Academy of General Practice and received many communications from the College of General Practitioners of United Kingdom. Finally these many ideas were reported and debated in a large meeting representative of many parts of organized medicine in Canada in April 1953. This exploratory committee reported to General Council that only an independent College of General Practice would meet our requirements. General Council authorized its formation. It is now set up and will be inaugurated on June 17 at Vancouver.

What does it mean? The aims and objects have been published and do not need repetition. In sum total they mean that the College will tap every source and explore all avenues to assist every practitioner in Canada to become a better doctor. This is indeed a large undertaking. It is realized how different this assistance will be for the physician in a large urban area and the one in a remote rural practice. It has been said so often, but not too often, that the family doctor is the backbone or foundation of the profession. We believe that to be true, and it is the ambition of this College to make certain that it will continue to be so in Canada.

There is an aim and objective that has not been published or written about, but I believe it to be true. It is the desire of the great majority of our profession to prevent any form of state control of medicine. We also believe that the majority of the citizens of Canada do not want this catastrophe to happen. The family doctor is the best ambassador that the profession has. He is close to the grass roots of our society. During the past few decades there have been a great many complaints that family doctors were no longer available, and that the quality of general practice was not what it might be. The changing order of medical practice and medical service has been talked about and written about but as yet we in the profession have not done much about this changing order. It would not be too difficult to visualize that our people might ask, as some already have asked, for the state to supply medical service. It is a serious ambition of this new College of General Practice to meet this challenge of our times. We believe that we who understand the mind and workings of the general practitioner can assist in increasing the prestige of family doctors and thereby increase their numbers and the quality of service. This should be an important contribution in the maintenance of our freedom.

Before I attempt to discuss how the College hopes to turn platitudes into reality, I wish to discuss briefly one criticism that we have met with during these six years. It is that the College would cause disunity within our Association and within the profession. It has been the opinion of all those interested in this project that the opposite is true. It has seemed to the practitioners that we were in danger of breaking into two parts: the super-trained specialists and the under-trained practitioners. It is our belief that specialists are an essential part of the profession. We also believe that the general practitioner is just as important and that in the field of preventive and curative medicine he should be part of the team furnishing that service. It is therefore the main objective of the College to help the practitioner to raise his standards. This is to be done largely during his active practice. We are not alone in this desire. The Cohen report to the British Medical Association recommends a three to four year apprenticeship type of training for general practice after graduation.

While these many ideas have been maturing during the past six years we have been accused of being tardy, of stating platitudes and of not revealing our program of function. This has now been done. It will take time, energy and money to bring it to full fruition.

Primarily the practitioner is to be helped to help himself with a continuous educational program. For those members of the profession who belong to a University Hospital it is a regular procedure to attend several conferences and ward rounds each week. They meet their associates and discuss their problems and the result is a continuous educational experience. The practitioner and especially the person without a hospital appointment has not this opportunity. The result can be isolation (in many cases this isolation is almost compulsory) and can lead to deterioration. We all know how constantly ideas change and how difficult it is to keep up with the times. It will be the function of the College to lead, to stimulate, to reward, and to find ways and means to overcome, at least in part, this serious handicap, the isolation of the general practitioner.

To begin with, the undergraduate starts with a great handicap. He enters university usually with the ambition to become a doctor. In recent times it has seemed almost inevitable that his teachers are departmental specialists. It is little wonder that by the end of his course he becomes a specialist. As yet we must confess that we do not know all the ways and means by which this tendency can be overcome but the universities have shown a great interest and desire to help. The College will co-operate with them in searching for the answers.

Following graduation the immediate training in approved hospitals has led in the great majority of cases to specialties. The specialties are becoming crowded while there is a great dearth of general practitioners. General practice is being done by those trained in one department. It is the hope of the College that a broader type of training can be evolved. As stated before we believe that specialist training is necessary but that a better practitioner training is also necessary. We believe that two years or more of postgraduate training is necessary before enter-

Canad. M. A. J.
April 1954, vol. 70

ing practice. However, part of this could be apprenticeship training as advised in the Cohen report in England. It is our desire that many hospitals that formerly have not taken any part in intern and postgraduate training may take on this important duty. We hope that a graduate who aims to become a responsible practitioner will divide his postgraduate training between university hospital, community hospital and apprenticeship to a general practitioner. We anticipate that during this time he will have at least sufficient income to live on.

It is following this stage, when the practitioner enters his own practice, that isolation may set in. It is our belief that our members will enjoy a continuing educational program throughout their career. It will be compulsory for each member to take an average of 50 hours of varied postgraduate training each year. This is roughly two weeks each year. We are conscious of the fact that this will be simple for the urban physician and difficult for the man in a remote and isolated spot. We expect to have a register of young graduates who will be willing to act as locum tenens for those who wish to get away for a postgraduate trip and holiday. This should be an extremely worthwhile experience for both parties. We hope to give credits for attendance at conferences, ward rounds and staff activities of all sizes of hospital. We likewise expect to stimulate and give credit for case reporting, book reviews and research in general practice. We know that these ideas are visionary as regards the whole profession but if 25 to 50% are sincerely stimulated it will be a really great contribution to Canadian medicine.

From the beginning we have had much debate about the problem of hospital appointments for general practitioners. So often it has been viewed only through the glasses of the university hospital appointment. This is an important and difficult problem but it is no more important than that of non-university hospital appointments. This subject is being studied and reviewed in all parts of the free world. There are certain principles to which the College adheres and from these principles will be worked out something basic and worthwhile. These principles are:

That a graduate with adequate training requires a hospital appointment. That Departments of General Practice, administrative in nature, should be present in all hospitals: much work has been accomplished along this line by the American Academy of General Practice and in many parts of Canada. That the Four R's of the Joint Commission for Accreditation of Hospitals will be respected. These are: Responsibility, Rules, Records and Review.

Establishment of a program with these basic principles as a foundation and guide will give practitioners an opportunity to develop responsibility and judgment and to progress.

In the minds of some, certificates have been given undue importance. In general, they will be used to designate a practitioner who has made an honest attempt to improve the standard of his practice by a continuing program of postgraduate education.

We have heard much about irresponsible practitioners during our discussions with hospital authorities. This subject must be the responsibility of many parts of our profession and our society, such as the universities, boards of governors of hospitals, medical staff and the Royal College of Physicians and Surgeons. We believe that a large percentage of practitioners are responsible persons and anxious to be given an opportunity to prove it. Privileges in hospitals are under the jurisdiction of the medical staff and the board of governors. In order to obtain privileges the practitioner must prove his ability, accept responsibility and be ready to have his work audited at all times.

There is finally the question of a higher degree or Fellowship in General Practice. The final details are yet to be worked out. It is the opinion of the organizing committee that it will be necessary "to establish Fellowship standards that will qualify recipients for greater responsibility in all aspects of medical practice including appointments in hospitals and universities." It should be understood that "hospitals" means all hospitals and not only university hospitals. The general aim of the College is to carry the principles of Hippocrates to all parts of the profession. Hence, leaders and teachers will be required in all parts of the country, even in those remote areas where a hospital is not present. It therefore seems reasonable to try to find and develop these leaders, hence the Fellowship standard. It is thought that Fellows of the R.C.P. and S. should be the teachers and leaders of specialists, while Fellows of the College of General Practice occupy a similar place for its members. It is hoped that much of the work to fulfil these requirements may be carried out while the candidates are in active practice.

This then summarizes thinking and conclusions arrived at during the last six years. It represents only the beginning, for there is much yet to be done. It will be done. Dr. Victor Johnston, the father of this movement, has given up the security of his practice to be executive director of the College during the days of its infancy. The College of General Practice of Canada is an important milestone in Canadian medicine. It has received the support of Canadian organized medicine. It deserves the support of all members of the profession. For those of us past the meridian of our careers there will be much to give, with little to receive. For those in the active productive years of life there will be much to give in leadership and support, but considerable rewards also. The great benefit will be to the youth in our profession and those yet to come, and through them to all citizens of Canada.

Association Notes

Preliminary Program

EIGHTY-SEVENTH ANNUAL MEETING

Canadian Medical Association

VANCOUVER, JUNE 14 - 18, 1954

President—Dr. C. W. Burns, Winnipeg.
President-Elect—Dr. G. F. Strong, Vancouver.
Chairman of the General Council—
Dr. N. H. Gosse, Halifax.
General Secretary—Dr. T. C. Routley, Toronto.
Deputy General Secretary—Dr. A. D. Kelly
Toronto.
Assistant Secretary—Dr. A. F. W. Peart, Toronto.

Preparations for the Eighty-Seventh Annual Meeting are well advanced and active local committees of the British Columbia Division have been busy in arranging a program of events which has elements of interest for every doctor and his wife. The General Council will meet on Monday and Tuesday, June 14 and 15 to discuss the business of the Association. The Scientific Program will commence on Monday, June 14 and will continue for five full days through Friday, June 18. In addition to the meetings of the Specialist Societies held in close relationship to the Canadian Medical Association, a full scale program of clinical presentations in Colour Television will take place during the first two and a half days of the meeting.

The Annual General Meeting will be held on Wednesday evening, June 16, and this event will be followed by the President's reception and

"The Pacific Shore in '54"

C.M.A. CONVENTION - JUNE 14 - 18, 1954

Make Your Reservation NOW

MAIL THIS APPLICATION

To:
HOWARD BLACK M.D.,
CHAIRMAN—HOUSING COMMITTEE,
ACADEMY OF MEDICINE BLDG.,
1807 WEST 10th AVE.,
VANCOUVER, B.C.

Please reserve the following:

MOTEL: Single ☐ Suite ☐ Kitchen facilities ☐

HOTEL: Single ☐ Twin ☐ Double ☐ Connecting doubles ☐ Suite ☐

Motel Price Range $3 to $5 per person single
$6 to $15 per family for suite.

Date of arrival..... A.M.— P.M.— Departure.....
Are you driving your own car?.....
Do you wish a U Drive car reserved?.....
Rooms will be occupied by.....

Name	Street address	City	Province

(attach additional names if necessary)

Send Confirmation to Doctor:.....
(please print)
Street.....
City.....
Province.....

Canad. M. A. J.
April 1954, vol. 70

dance. A unique feature of medical week in Vancouver will be the inaugural ceremony to launch the College of General Practice of Canada. This historic occasion will be held on Thursday, June 17.

The preliminary program of scientific sessions is as follows:

Monday, June 14

CLINICAL PROGRAM IN COLOUR TELEVISION

9.30 a.m. - 12.00 p.m.

Radical Removal of the Breast.
Dr. Roger Wilson; Dr. Lyon H. Appleby; Dr. Ronald D. Nash.

The Treatment of Squint.
Dr. John A. McLean; Dr. Derek G. Simpson; Dr. Roy J. Paine; Dr. E. F. Raynor.

Clinical Use of Radioactive Iodine in Diseases of the Thyroid Gland.
Dr. E. T. Feldsted; Dr. Hamish W. McIntosh.

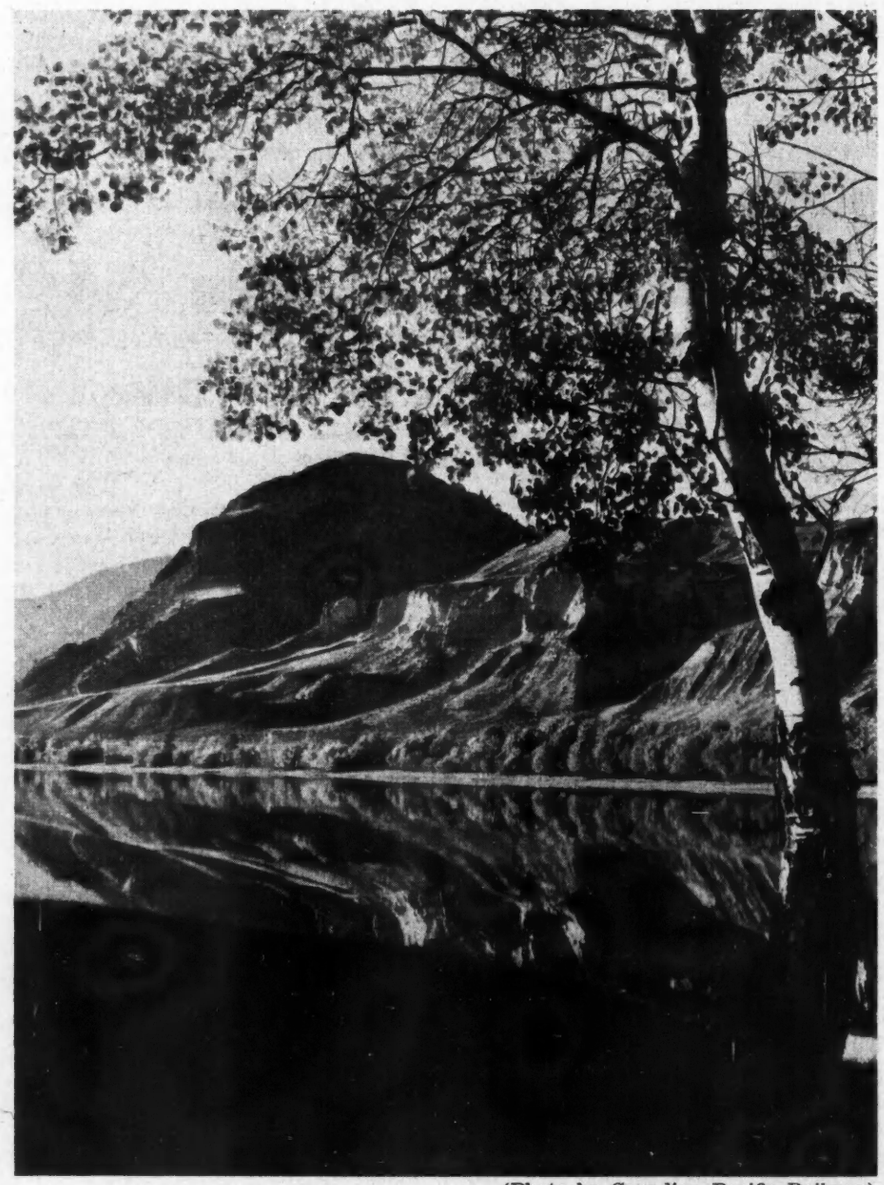
Arterial Insufficiency.
Dr. T. R. Sarjeant.

2.00 p.m. - 4.30 p.m.

Oral Cancer.
Dr. A. M. Evans; Dr. Ronald D. Nash.

Evaluation of the Obstetrical Pelvis.
Dr. A. E. Trites.

The Hæmolytic Anæmias.
Dr. William H. Perry.



(Photo by Canadian Pacific Railway)
South Thompson River, Monte Creek, B.C.

Safe Anæsthetic Procedures for Obstetrical Practice.
Dr. Eric Webb.

Demonstration of Plaster Techniques.
Dr. F. C. Preston.

Tuesday, June 15

Clinical Program in Colour Television

9.30 a.m. - 12.20 p.m.

Solitary Lesion of Lung.
Dr. W. Elliott Harrison; Dr. R. Wallace Boyd; Dr. Gordon F. Kincade; Dr. P. W. Morse; Dr. Malcolm Allan; Dr. H. Dumont.

Intra-articular Injections.
Dr. Arthur W. Bagnall.

Surgical Treatment of Emergencies.
Dr. Allan D. McKenzie; Dr. R. G. Langston; Dr. J. W. Cluff; Dr. Cameron S. Allen; Dr. K. D. Charron.

2.00 p.m. - 4.30 p.m.

Parenteral Fluid Administration to Infants.
Dr. J. W. Whitelaw; Dr. Margaret Mullinger.

Obesity.
Dr. Hamish W. McIntosh.

A Clinical Demonstration of Joint Disabilities.
Dr. A. S. McConkey.

External Version.
Dr. Jack E. Harrison.

Acne.
Dr. Donald Williams.

Wednesday, June 16

Clinical Program in Colour Television

9.00 a.m. - 12.00 noon.

Cæsarean Section and Resuscitation.
Dr. Fergus Johnston; Dr. E. B. Trowbridge; Dr. Peter H. Spohn; Dr. Geoffrey C. Robinson.

Neurological Gaits.
Dr. Charles E. G. Gould.

Examination of a Normal Newborn.
Dr. A. F. Hardyment.

Rehabilitation Procedures.
Dr. F. P. Patterson; Dr. Harold H. Boucher; Dr. Donald E. Starr; Dr. Howard Weaver; Dr. William J. Thompson.

Wednesday, June 16

Section of Historical Medicine

9.00 a.m. - 10.30 a.m.

Canadian Psychiatry—An Historical Outline.
Dr. E. L. Margetts, Montreal.

Medical Men and Creative Writing.
Dr. T. F. Rose, Victoria.

William Hamey and the Valves of the Veins: or, The Care and Feeding of a Legend.
Dr. Lloyd Stevenson, London.

The Two Hameys—The Stranger and the Son.
Dr. J. W. Macleod, Saskatoon.

GENERAL SESSION

2.00 p.m. - 3.30 p.m.

Valedictory Address.
Dr. C. W. Burns, Winnipeg.

Some Recent Advances in the Treatment of Hæmatologic Disorders.
Dr. C. C. Sturgis, Ann Arbor, Mich.

The Lister Lecture—Chemotherapy of Tuberculosis.
Sir Howard Florey, Oxford, England.

ROUND TABLE CONFERENCES

3.45 p.m. - 5.15 p.m.

Rehabilitation.
Dr. Wallace Wilson, Vancouver (Chairman); Dr. H. Hoyle Campbell, Toronto; Dr. Frank A. Turnbull, Vancouver; Dr. Arthur W. Bagnall, Vancouver; Mr. S. Alan S. Malkin, Nottingham, England.

Use of ACTH and Cortisone in Pædiatric Practice.
Dr. Reginald H. Wilson, Vancouver (Chairman); Dr. A. L. Chute, Toronto; Dr. C. Collins-Williams, Toronto; Dr. Maurice Young, Vancouver; Dr. Hamish McIntosh, Vancouver.

Lesions of the Breast.
Dr. T. R. Sarjeant, Vancouver (Chairman).

Clinical-Pathological Conference

Dr. William Boyd, Vancouver; Dr. H. Rocke Robertson, Vancouver; Dr. Murray McC. Baird, Vancouver; Dr. Roger Wilson, Vancouver.

Thursday, June 17

Session A

9.00 a.m. - 10.30 a.m.

Hypogonadism.
Dr. H. W. McIntosh, Vancouver.

A Canadian Table of Average Weights.
Dr. L. B. Pett, Ottawa.

Gout.
Dr. H. G. Kelly, Kingston.

Lead Absorption and Its Control.
Dr. W. S. Huckvale, Trail.

An Evaluation of Various Forms of Treatment of Toxic Goitre.
Dr. C. C. Sturgis, Ann Arbor, Mich.

Pyogenic Infections of the Skin.
Dr. G. B. Sexton, London.

Section of Anæsthesia

Intravenous Demerol Anæsthesia.
Dr. H. Randall, Vancouver.

Clinical Evaluation of Hexylcaine Hydrochloride (Cyclaine) as a Local Anæsthetic Drug.
Dr. R. A. Gordon, Toronto.

Obstetrical Anæsthesia.
Dr. J. A. McNab, Vancouver.

Anæsthetic Procedures in a Small Community Hospital.
Dr. L. J. Patterson, Red Deer.

Business Meeting, Section of Anæsthesia.

Canad. M. A. J.
April 1954, vol. 70

Section of Radiology

The Use of Radioiodine in Thyrotoxicosis.
Dr. E. T. Feldsted, Vancouver.

Benign and Malignant Gastric Ulcers.
Dr. G. I. Norton, Vancouver.

Diagnosis and Treatment of Calcifying Lesions of the Shoulder Joint.
Dr. Roger Hall, Edmonton.

Recent Advances in the Control of Breast Cancer Metastasis.
Dr. O. M. Sadler, Vancouver.

Session B

Common Rectal Disorders.
Dr. C. C. Jackson, Vancouver.

Topic to be announced.
Dr. N. L. Elvin, Winnipeg.

Partial Gastrectomy and its Sequelæ.
Dr. F. I. Lewis, Toronto.

Rehabilitation in Poliomyelitis.
Dr. W. J. Thompson, Vancouver.

Conservative Treatment of Fractures of the Elbow Joint.
Dr. F. R. Tucker, Winnipeg.

Phlebitis—Its Long Term Outlook.
Dr. James R. Francis, Calgary.

12.00 noon - 2.00 p.m.

Launching of the College of General Practice of Canada.

GENERAL SESSION

2.00 p.m. - 3.30 p.m.

The Surgical Treatment of Mitral Stenosis.
Dr. Ross Robertson, Vancouver.

Obstetric Deaths.
Dr. Bayard Carter, Durham, N.C.

The National Sickness Survey.
Dr. G. D. W. Cameron, Ottawa.

ROUND TABLE CONFERENCES

3.45 p.m. - 5.15 p.m.

New Drugs.
Dr. R. B. Kerr, Vancouver (Chairman).

Communicable Diseases—Prevention, Diagnosis and Treatment.
Dr. J. F. McCreary, Vancouver (Chairman); Dr. A. J. Rhodes, Toronto; Dr. H. Medovy, Winnipeg.

Pregnancy and Its Relation to Various Systemic Diseases.
Dr. F. W. B. Hurlburt, Vancouver (Chairman); Dr. A. M. Agnew, Vancouver; Dr. W. A. Oille, Toronto; Dr. D. R. Wilson, Edmonton; Dr. L. Lowenstein, Montreal.

Clinical-Pathological Conference

Staphylococcal Pneumonia and Empyæma in Infancy.
Dr. Desmond Magner, Ottawa; Dr. D. S. Munroe, Vancouver; Dr. D. J. Conway, Ottawa.

Friday, June 18

Session A

9.00 a.m. - 12.00 noon.

Carbon Tetrachloride Poisoning.
Dr. G. C. Robinson, Vancouver.

The Diagnosis of Cardiac Infarction.
Dr. G. W. Manning, London.

Recent Advances in the Approach to Psychosomatic Problems.
Dr. A. B. Stokes, Toronto.

A Physician Looks at Gastrectomy.
Dr. A. M. Johnson, Vancouver.

The Comatose Patient.
Dr. E. F. Brooks, Toronto.

The Anæmias.
Dr. D. G. Cameron, Montreal.

Session B

The Management of Bleeding Peptic Ulcers.
Dr. G. F. Homer, Victoria.

The Diagnosis of the Acute Abdomen.
Dr. F. H. Wigmore, Moose Jaw.

The Value of Sectional Radiography.
Dr. Charles Vaughan, Hamilton.

Tracheotomy.
Dr. N. J. Blair, Vancouver.

Urological subject.
Dr. C. B. Stewart, Winnipeg.

Emergency Surgery of the Newborn.
Dr. J. R. Neilson, Vancouver.

Armed Forces Medical Section

Lessons for Civilians Derived from the Air Evacuation of Military Patients.
Air Commodore A. A. G. Corbet, Ottawa.

The Canadian Forces Medical Council—Its Place in National Defence.
Dr. J. A. MacFarlane, Toronto.

The Effective Use of Medical Manpower in a National Emergency.
Air Marshal Sir Philip Livingston, Duncan.

Report from Korea.
Brigadier K. A. Hunter, Ottawa.

Section of Obstetrics and Gynæcology

Management of the Cardiac Patient in Pregnancy.
(a) Medical Aspects—Dr. C. G. Campbell, Vancouver.
(b) Obstetrical Aspects—Dr. Thomas Primrose, Montreal.

Carcinoma In Situ of the Cervix.
Dr. Bayard Carter, Durham, N.C.

Hydatidiform Mole and Chorioepithelioma.
Dr. J. R. McArthur, Toronto.

Placental Pathology.
Dr. J. P. A. Latour, Montreal.

Section of Ophthalmology

Ocular Pemphigus.
Dr. D. G. Simpson, Vancouver.

Topic to be announced.
Dr. J. W. Duggan, Edmonton.

Intraocular Acrylic Implant of Ridley—A Series of Cases.
Dr. J. P. Harshman, Toronto.

Ocular Muscles.
Dr. E. F. Raynor, Vancouver.

Epithelial Downgrowth.
Dr. K. O. Fleming, Vancouver.

GENERAL SESSION

2.00 p.m. - 3.30 p.m.

Therapeutic Possibilities in the Lymphomas.
Dr. D. M. Whitelaw, Vancouver.

Guest speaker and Topic to be announced.

Surgical Emergencies in the Newborn: Their Recognition and Treatment.
Dr. C. C. Ferguson, Winnipeg.

ROUND TABLE CONFERENCES

3.45 p.m. - 5.15 p.m.

Current Treatment of Allergic Disease.
Dr. C. H. A. Walton, Winnipeg (Chairman); Dr. T. H. Aaron, Edmonton; Dr. A. R. Birt, Winnipeg; Dr. J. D. L. FitzGerald, Toronto; Dr. Bram Rose, Montreal.

Do's and Don't's in the Treatment of Common Skin Disorders.
Dr. D. H. Williams, Vancouver (Chairman).

Gall Bladder Disease.
Dr. L. H. Appleby, Vancouver (Chairman).

Clinical-Pathological Conference

Dr. H. H. Pitts, Vancouver; Dr. A. Y. McNair, Vancouver.

MEDICAL COLOUR TELEVISION— ITS PAST AND FUTURE

PART I.

WHEN COLOUR TELEVISION makes its appearance in the scientific teaching program of the annual meeting of the Canadian Medical Association, the medium will enter its sixth year of service to the medical profession.

The history of colour television in medicine necessarily begins in the failure of black-and-white television to meet the visual demands of medical subject matter. Smith, Kline & French Laboratories, a Philadelphia and Montreal pharmaceutical firm, after presenting one black-and-white medical program in 1948, recognized that the limitations of a monochrome medium were severe enough to prevent its complete acceptance by the medical profession. Lacking colour, subtle but highly essential medical material such as tissue differentiation, areas of infection, localization of vital arteries and veins, and the extent of circulation could not be clearly represented. Probably the greatest single difficulty was the fact that red is almost invisible in black-and-white reproduction. Colour television was the only answer.

Taking the initiative, SKF contacted the Research and Engineering Division of the Columbia Broadcasting System, whose experimental work in the field was known. CBS said it was possible to custom build a colour television camera, camera chain, and enough receivers to accommodate an audience of 1,000 persons. SKF placed the order and, in April 1949, the equipment was delivered. The camera itself resembled none in existence. Mounted on the end of a six-foot boom the camera head could be suspended directly over the operating table and well above the heads of the operating team. On June 6, 1949 in Atlantic City SKF presented the first public showing of colour television at the annual meeting of the American Medical Association. The success of the program exceeded all expectations as 30,000 doctor-visits were recorded for the four days of televised presentations.

Now, five years later, medical colour television has compiled a remarkable record of achievement. While the medium is still a vague thing of the future for the lay public, the medical profession has viewed from 100 to 200 hours of colour television every year since 1949. Nor has Smith, Kline & French, which sponsors and produces all colour telecasting at medical meetings, confined the use of its postgraduate teaching aid to the United States. The Canadian Medical Association presented a program of medical colour television in Montreal at its annual meeting in 1951. This also represented the first showing of the colour medium in Canada. Following the C.M.A. telecasts, Europe had its first look at colour TV in an SKF program for the International Society of Surgeons meeting in Paris. The appearance of medical colour television in Vancouver will mark the 58th medical meeting where colourcasts have been included in the scientific teaching program.

But the colour medium brings to Canada more than a history. Many new developments in equipment and production techniques have been incorporated into the programs. On view for the first time in Canada will be two projection-type receivers equipped with 4½ by 6 foot screens. These receivers were specially built for medical colour television by CBS and present the audience with a picture 27 times larger than the original 12-inch colour sets. Less spectacular additions, such as a highly mobile studio-type camera, have also contributed to picture quality.

In what amounts to an ascending cycle, expanded technical facilities have enabled pro-

Canad. M. A. J.
April 1954, vol. 70

duction techniques to accommodate much more diverse and elaborate medical material. Thus the scope of the programs has widened to the point where presentations impossible to televise satisfactorily in the past are now brought before the audience with ease and clarity. Physicians at Vancouver will view a medium grown to maturity since its last visit to Canada.

(To be concluded in the May issue)

CONFERENCE OF SECRETARIES AND P.R. CHAIRMEN

A NEW DEPARTURE in the development of The Canadian Medical Association occurred in February when two national conferences took place in Toronto. The first mid-winter conference of Divisional Secretaries was held February 4 and 5, and the first National Conference on Medical Public Relations followed on February 5 and 6.

These were working parties of the officials who serve the Divisions and the Chairmen of provincial Committees on Public Relations, meeting for the first time with the nucleus of the national Committee. The conferences were unique in that attendance was 100%; every Secretary and every P.R. Chairman from every province was not only in attendance but also participated actively in discussions of practical problems.

The agenda was packed with matters which reflect the widespread interests of the organized medical profession, matters which concern every doctor and which have as their ultimate objective improvements in health services to the people of Canada.

It is a good thing for our Association, and incidentally for national unity, that representatives from each of the ten Divisions of the Canadian Medical Association should get together to debate the issues of the medical profession and its relationship to the public. The growing importance of satisfactory liaison between our profession and members of other sections of the general public scarcely needs emphasis. The occasion was recorded in the photograph reproduced here.

(Photo by Herb Nott & Co., Toronto)

First C.M.A. Conference on Public Relations

Toronto, February 5 and 6, 1954

Left to right—back row: Dr. R. A. Mustard, Nucleus Committee; Dr. E. F. Crutchlow, Quebec Div.; Dr. G. W. Peacock, Saskatchewan Div.; Dr. F. L. Whitehead, New Brunswick Div.; Dr. F. C. Jennings, New Brunswick Div.; Dr. T. C. Michie, Alberta Div.; Dr. L. A. Sigurdson, Manitoba Div.; Dr. M. T. Macfarland, Manitoba Div.; Dr. A. D. Kelly, Deputy General Secretary; Dr. H. Gordon Young, Saskatchewan Div.; Dr. T. C. Routley, General Secretary; Dr. G. I. Sawyer, Ontario Div.; Dr. Jacques Durivage, Quebec Div.; Dr. A. W. Bagnall, British Columbia Div.; Dr. G. G. Ferguson, British Columbia Div.; Dr. Wm. Bramley-Moore, Alberta Div.; Dr. A. F. W. Peart, Assistant Secretary. Front row: Dr. H. W. Moyse, Prince Edward Island Div.; Dr. F. G. Barton, Nova Scotia Div.; Dr. L. V. Lang, Ontario Div.; Dr. E. C. Steele, Nucleus Committee; Dr. J. W. Graham, Nucleus Committee; Dr. W. G. Bigelow, Chairman, C.M.A. Committee on Public Relations; Dr. W. C. Givens, Nucleus Committee; Mr. A. K. Gillies, Ontario Div.; Dr. P. O'D. Gallagher, Newfoundland Div.; Dr. R. J. Simms, Newfoundland Div.; Dr. J. H. Maloney, Prince Edward Island Div.

MEDICAL SOCIETIES

EASTERN ASSOCIATION OF ELECTROENCEPHALOGRAPHERS

A Symposium on wave and spike abnormalities in the electroencephalogram was held from March 4 to 6 in St. Adele Lodge, P.Q. The meeting was attended by electroencephalographers from the eastern United States and Canada; scientific sessions were held in the late afternoons, while the mornings were devoted to skiing.

MISCELLANY

FOOLISH FRIENDS IN THE SICKROOM

[*What Florence Nightingale had to say in 1859* is still worth listening to. We therefore are glad to reprint her remarks in commemoration of World Health Day, April 7.*—EDITOR.]

FLORENCE NIGHTINGALE

I really believe there is scarcely a greater worry which invalids have to endure than the incurable hopes of their friends.

There is one practice against which I can speak more strongly from actual personal experience, wide and long, of its effects during sickness observed both upon others and upon myself. I would appeal most seriously to all friends, visitors, and attendants of the sick to leave off this practice of attempting to "cheer" the sick by making light of their danger and by exaggerating their probabilities of recovery.

Supposing the patient to be possessed of common sense—how can the "favourable" opinion, if it is to be called an opinion at all, of the casual visitor, "cheer" him—when different from that of the experienced (medical) attendant. Unquestionably the latter may, and often does turn out to be wrong. But which is most likely to be wrong?

The fact is, that the patient is not "cheered" at all by these well-meaning, most tiresome friends. On the contrary he is depressed and wearied. . . . He feels what a convenience it would be if there were any single person to whom he could speak simply and openly, without pulling upon himself the string of this shower-bath of silly hopes and encouragements.

On the other hand, there is nobody so credulous as a credulous invalid, except perhaps, the credulous friends of a credulous invalid.

How often does it happen that, no sooner have the doctor and nurse come to a perfect understanding as to what must be done, than the nurse is surprised by having an opinion given her as to what ought be done from somebody she never heard of before. It is sometimes an old friend or an old school-fellow who suddenly finds out that everybody, patient, doctor, nurse, has been wrong, and that such and such other management would answer better; and everything is upset, confidence is destroyed or disturbed, everybody is annoyed, but only one person is injured, and that is the patient.

So also as to all the advice showered so profusely upon the sick, to leave off some occupation, to try some other doctor, some other house, pill, powder, or specific. I say nothing of the inconsistency, for these advisers are sure to be the same persons who exhorted the sick man not to believe his own doctor, because "doctors are always mistaken", but to believe some other doctor, because "this doctor is always right".

Wonderful is the face with which friends will come in and worry the patient with recommendations to do something or other, having just as little knowledge as to its being feasible, or even safe for him, as if they were to recommend a man to take exercise not knowing he had broken his leg.

To me these commonplaces, leaving their smear upon the cheerful, single-hearted, constant devotion to duty which is so often seen in the decline of such sufferers, recall the slimy trail left by the snail on the sunny southern garden-wall loaded with fruit.

To nurses I say—these are the visitors who do your patient harm. When you hear him told: (1) That he has nothing the matter with him, and that he wants cheering; (2) That he is killing himself, and that he wants preventing; (3) That he is the tool of somebody who makes use of him for a purpose; (4) That he will listen to nobody, but is obstinately bent on his own way; and (5) That he ought to be called to the sense of duty, and is flying in the face of Providence—then know that your patient is receiving all the injury that he can receive from a visitor.

How little the real sufferings of illness are known or understood. How little does anyone in good health fancy him or even *herself* into the life of a sick person!

Do, you who are about the sick, or who visit the sick, try and give them pleasure, remember to tell them what will do so. A sick person does so enjoy hearing good news: for instance, of a love and courtship, while in progress to a good ending. If you tell him only when the marriage takes place, he loses half the pleasure, which God knows he has little enough of; and ten to one but you have told him of some love-making with a bad ending.

A sick person also intensely enjoys hearing of any *material* good, any positive or practical success of the right. He has so much of books and fiction, of principles, of precepts, and theories; do, instead of advising him with advice he has heard at least fifty times before, tell him of one benevolent act which has really succeeded practically, it is like a day's health to him.

There is no better society than babies and sick people for one another. Of course you must manage this so that neither shall suffer from it, which is perfectly possible. If you think the "air of the sick-room" bad for the baby, why it is bad for the invalid too, and therefore, you will of course correct it for both. It freshens up a sick person's whole mind to see "the baby". And a very young child, if unspoiled, will generally adapt itself wonderfully to the ways of a sick person, if the time they spend together is not too long.

If you knew how unreasonably sick people suffer from reasonable causes of distress, you would take more pains about all these things.

---

*Notes on Nursing, Florence Nightingale, published by Gerald Duckworth, London, 1952.

Canad. M. A. J.
April 1954, vol. 70

WORLD MEDICAL ASSOCIATION

IT WAS DECIDED last year in Executive Committee to study the possibility of re-establishing a Canadian Supporting Committee to the World Medical Association. This type of committee had first come into existence some years ago under the leadership of Dr. Wallace Wilson of Vancouver, and afterwards of the late Dr. William Magner. It had however lapsed in recent years. Now it was felt that with the steady and growing interest in the work of the World Medical Association Canada should again make an effort to provide at least some proportion of the support of the World Medical Association, both moral and financial, which is as welcome as it is necessary.

A further reason for this support from Canada lies in the fact that so much in this direction has been and is being done by the United States Supporting Committee, whose liberal gifts contribute such a large proportion of the cost of carrying on the work of the World Medical Association that they may be said to benefit Canada indirectly.

It was with these things in mind that a group of medical men along with several representatives of the pharmaceutical industry met in Toronto on Thursday, February 25, under the chairmanship of Dr. Léon Gérin-Lajoie. Some 25 men from across Canada were present.

After a discussion of the aims of the World Medical Association and its difficulties in attaining all its objectives on account of its lack of funds, the Supporting Committee was formally constituted and officers elected as follows: Chairman: Dr. Léon Gérin-Lajoie; Honorary Secretary: Dr. Arthur D. Kelly; Honorary Treasurer: Dr. T. C. Routley; Honorary Solicitor: Mr. A. L. Fleming.

A small committee composed of the above named officers and not less than three representatives from the pharmaceutical industry to be appointed by the Canadian Pharmaceutical Manufacturers' Association with power to add, was constituted to study all the approaches to the problem, to draft some regulations and give to the new Supporting Committee legal status. It was suggested that other important national bodies and individuals, who might be interested in giving their support to the Committee, might be approached.

Following the example of our American friends it was decided to seek donations from two types of well wishers of the work of W.M.A. (a) individual donations of $10.00 or more per year and (b) corporate donations from firms and organizations. The Canadian Medical Association has itself taken the lead by pledging a corporate donation of $1,000 to the work of the Canadian Supporting Committee. Individual members of the medical profession may demonstrate their interest in the work by sending contributions to the Honorary Treasurer at 244 St. George Street, Toronto.

Vancouver was set for the next meeting of the Supporting Committee at the time of the Annual Meeting of the Canadian Medical Association. Before the motion of adjournment, the Chairman was directed to report to the C.M.A. Executive in the form of a progress report. The minutes when duly drafted and approved will be forwarded to the Canadian Pharmaceutical Manufacturers' Association, the Canadian Medical Association and the members of the Supporting Committee.

CORRESPONDENCE

CONGENITAL MICROCOLON AND THE THYROID

To the Editor:

I am more than ordinarily interested in the case report of Congenital Microcolon by Dr. J. Lavoie in your February number. Some years ago I delivered a Mrs. V. of four babies. Her first was a normal child. The next three all had microcolons and lived but a few days in consequence.

At the time I was working on the subject of thyroid competency in pregnancy for my Presidential address to the Newfoundland Medical Association and the danger of abortion, or mental deficiency in the child, if the thyroid was not capable of raising the B.M.R. rate some 10 to 15% above the normal rate. It was not till after the third microcolon that I wondered if thyroid insufficiency could be the cause of an anatomical anomaly. I decided to estimate Mrs. V's. B.M.R. should she again become pregnant.

But I happened to see Mrs. V. passing on the street and noticed she was pregnant. As I had not been engaged this time I made enquiries and found which of my confrères had been engaged and talked to him of my intended experiment. Unfortunately he could not have her B.M.R. estimated as I had the only machine in the city at that time. So, I said, "be a sport and give her a grain of thyroid t.i.d. for the rest of her pregnancy". He agreed. The baby was normal.

The next year I again noticed Mrs. V. was pregnant. But my confrère who had attended her the previous year was now out of general practice. Again I located the doctor who had been engaged and he too was a good sport and gave her the thyroid and again the baby was normal. Her husband died shortly afterwards and I have not heard of her marrying again.

I am quite aware that all this *proves nothing*. The B.M.R. was not taken, but against that one could suppose that a grain of thyroid t.i.d. would have caused discomfort had it not been needed.

I do know that I have had many cases whose B.M.R. is normal when they are not pregnant but is not raised in pregnancy and that in such cases abortion is frequent and can be avoided by giving thyroid to bring the B.M.R. to +15 or +20%. I know that if I deliver another baby with a microcolon I should give thyroid in a subsequent pregnancy to the limit of comfort.

Dr. Lavoie had probably been through the literature on this anomaly for he states that such cases are "very scarce". I should like to know if he encountered in his search a case of three consecutive births having microcolons.

CLUNY MACPHERSON

SPECIAL CORRESPONDENCE

The London Letter

(From our own correspondent)

SMOKING AND CANCER

After an incubation period of over three years the tobacco-cancer-of-the-lung controversy has at last come to a head, gained the headlines of the national papers for a brief weekend, stirred the dovecotes of the tobacco industry, and rapidly reverted again to the more objective domain of the research laboratory and statistical calculator where, it is to be hoped, it will be allowed to remain until a more definite answer can be given to the question of whether or not smoking is a cause of cancer of the lung.

The cause of the irruption was the Minister of Health's answer to a question in the House of Commons, which was preceded by a press conference. For three years the Minister's Standing Advisory Committee on Cancer and Radiotherapy has been giving "close consideration" to the problem, and in 1953 they asked a panel under the chairmanship of the Government Actuary to report on the validity of the available statistical evidence. On the basis of this report the committee advised the Minister that "it must be regarded as established that there is a relationship between smoking and cancer of the lung", but that "though there is a strong presumption that the relationship is causal, there is evidence that the relationship is not a simple one". They also expressed the view that "it is desirable that young people should be warned of the risks apparently attendant on excessive smoking". The Minister announced that he accepted the committee's view that "the statistical evidence points to smoking as a factor in lung cancer" but drew attention to "the fact that there is so far no firm evidence of the way in which smoking may cause lung cancer or of the extent to which it does so".

The response of the tobacco manufacturers was immediate and, on the whole, commendably restrained. The most important part of their statement was that they had arranged to make available over the next seven years a fund of £250,000 in aid of research into the cause of cancer of the lung. This offer has been accepted by the Medical Research Council which will have complete discretion in the timing of the expenditure, in the choice of research projects to be supported, and in the publication of results. Meanwhile, many are wishing that a fraction of this sudden interest in the possible carcinogenic effect of smoking could also be devoted to the problem of atmospheric pollution which would seem to be just as badly implicated as tobacco, and to have the great disadvantage, compared with smoking, that the latter need not be indulged in, whereas the only current methods of avoiding the dire effects of atmospheric pollution are emigration or permanent apnœa.

THE MINISTER AND WHOLE-TIME CONSULTANTS

One of the most disintegrating influences in the National Health Service at the moment is the perpetually recurring, parrot-like demand of the left-wing socialist groups for a full-time consultant service. At a recent B.M.A. dinner the present Minister of Health made it perfectly clear that as long as he and his colleagues were in office there was no question of any action being taken to interfere with the present system. The relevant section of his speech is worth quoting in *extenso*:

"For a long time there has been considerable controversy about the future of the consultant and specialist service within the N.H.S. It would be strange indeed if all the echoes of conflict within the last few years had died down, and it is idle to pretend that there are not amongst politicians two schools of thought. There is one school which says that the future of consultants and specialists (and the future of general practitioners as well) lies in a whole-time salaried service. I personally give you my opinion that that would be disastrous. I know perfectly well that different people hold that opinion, and sincerely, but it does seem to me that in the pursuit of that particular aim there is some danger of suggestions that I think are utterly unworthy being made. I am particularly concerned at the suggestion that in some strange way whole-time specialists are different from part-time specialists. . . . To listen to the speeches which are made on the subject one might come to think that all the whole-time consultants are unselfish, righteous, holy people—and, of course, socialists—while the part-time consultants are wicked, money-grabbing charlatans—and, of course, Tories. . . . Consultants and specialists are not primarily whole-time or part-time, they are primarily doctors, and they have the same standard of ethics and conduct towards their patients whether those patients are in private rooms or in wards, and whether the consultant works whole-time or part-time or in fact is not within the N.H.S. at all".

CARDIOLOGISTS AND THE TREASURY

It is easier for a camel to go through the eye of a needle than for a professional man to obtain dollars to allow him to attend a conference in the dollar area. So far as this post-war era is concerned, the British Treasury is quite convinced that man can live by bread only, and therefore dollars shall not be spent for the improvement of the mind. As the most law-abiding citizens in the world, we usually accept these totalitarian rulings, but every now and then feeling on the subject reaches such a pressure that the lid blows off—and if the explosion is violent enough or influential enough, the Treasury deigns to relax its rules—though seldom with a good grace. The British Cardiac Society, normally one of the most retiring and undemonstrative of organizations, has just gained itself some well-earned publicity by refusing to knuckle under to the Treasury. The Society decided to send 32 delegates to the forthcoming international congress of cardiology in Washington, and applied to the Treasury for allowances of £10 a day for them. The response was approval for 20 of them to receive a daily allowance of £7. The Society was immediately up in arms, released the news to the press and described it as "just a bit of bureaucracy". Three weeks later it was announced that all 32 delegates had been granted dollar allowances!

WILLIAM A. R. THOMSON

London, March, 1954.

A four-year study has been made in California of the relation of occupations and of tobacco usage to lung cancer. A total of 518 patients under treatment in 11 California hospitals for carcinoma of the lung, and a control series matched for sex, age and race, were interviewed. Of the patients with carcinoma 484 (93%) smoked cigarettes, as against 394 (76%) of controls. There was no significant difference as regards other forms of tobacco usage between the two groups. This suggestion of an effect due to cigarettes is consistent with results in other studies, and in addition some evidence was obtained that cigarette smoking may affect the development of epithelial carcinoma of the lung more than adenocarcinoma. "Excessive cigarette smoking" (two or more packs per day) occurred almost four times as commonly in the cancer patients as in the controls. It is suggested that for men aged 50 to 59 the prevalence of lung carcinoma is from four to 11 times as great among smokers as among non-smokers, and from seven to 27 times as great among heavy smokers as among non-smokers.

A number of occupational groups including welders, steam fitters, boilermakers, asbestos workers, marine engineers, painters and cooks, are listed in which there are grounds for further investigation of a possible occupational factor in the etiology of pulmonary carcinoma. —Breslow, L., Hoaglin, L., Rasmussen, G. and Abrams, H. K.

Canad. M. A. J.
April 1954, vol. 70

OBITUARIES

DR. BENJAMIN WILLIAM APPLETON, aged 47, died in Toronto on January 20. Born in New York, he received his education in Toronto. A graduate of the University of Toronto, specializing in internal medicine, Dr. Appleton practised in Toronto for the past 20 years. He is survived by his widow and two sons.

DR. GEORGE EDWIN BRUCE, aged 79, died at his home in Swan River, Man., on January 30. Born in Barrie, Ont., he went to Winnipeg at an early age. After graduation from Manitoba Medical College in 1901, Dr. Bruce established his practice in Swan River, a town then in its second year. As medical practitioner he served the town and community for 48 years, retiring in 1949. He is survived by his widow and one daughter.

DR. NANCY RODGER CHENOWETH died in Peterborough, February 15, after a prolonged illness. Dr. Chenoweth was born Nancy Rodger, in Belwood, Ont., May 31, 1873. She entered Trinity Medical College and Women's Medical College of Toronto (later incorporated with the University of Toronto) graduating in 1894. A girl of 21 years—she began practice in Michigan, before her marriage to Rev. George T. Chenoweth. With him she went to the Northwest Territories of Canada (now Alberta) and began practice in Walsh (near Medicine Hat) as part of her husband's Methodist Ministry to that Country. Later their Ministry transferred to the coal mining area of Alberta and British Columbia, in Pincher Creek and Michel, B.C. Her husband died in 1911. She returned to Michigan again and after a refresher course and postgraduate study in x-ray at the University of Chicago in 1915, she installed one of the first x-ray machines in the Upper Peninsula, Michigan, before the hospitals had considered them desirable equipment. At that time, problem cases were sent up to 200 miles, to her office for x-ray investigation. She continued her work and was honoured by the Michigan State Medical Society in 1945, by being made a life member with the title Member Emeritus.

In 1947, she renewed her licence to practice in Ontario, and moved to Peterborough to be with her son Rodger, with whom she became associated in practice. In May of 1950 she fell victim of a cerebral thrombosis, from which she did not completely recover.

DR. WILLIAM EDWARD RAYMOND COAD died on February 17, aged 81. Coming from Ontario, he practised at Franklin, Manitoba, from 1898 to 1920 with service overseas from 1916 to 1919 with the C.A.M.C. After three years postgraduate study in Scotland and England where he obtained the F.R.C.S. degree, he practised in Winnipeg until 1938. Keenly interested in pathology, he was honorary curator of the Pathological Museum in Manitoba Medical College. He was a past secretary of the Manitoba Medical Association. A brother survives him.

DR. EDGAR M. COPP, who practised medicine in Sackville, N.B., for more than 50 years, died in January after a prolonged illness. Born at Jolicure, he graduated from the Jefferson Medical School in Philadelphia, Pa., and opened his practice in Sackville. In 1945 Dr. Copp was honoured for his 50 years of service in the medical profession. He is survived by his three sons.

DR. AUGUSTUS RICHARD CURTIS, one of the early graduates of Trinity Medical College, Toronto, died in Barrie, Ont., on December 21, 1953. Born in Oro Township in 1872, he taught school for several years before attending medical college. In 1905, Dr. Curtis graduated from Trinity Medical College; two years later he obtained his medical degree. He practised medicine in North Dakota and Montana until his retirement in 1946 when he moved to Barrie.

DR. JOHN R. DAVIES died in Vancouver General Hospital on January 28 after collapsing while shovelling snow at his home. A native of Ontario, he had graduated in medicine from Queen's University in 1916 and had practised medicine in Vancouver since 1917. A specialist in pædiatrics, Dr. Davies was head of that department at Vancouver General Hospital for 13 years. He was assistant chief of the children's division of the Hospital and associate professor of medicine at the University of British Columbia. Dr. Davies is survived by his widow, his son and his father, all of Vancouver.

DR. THOMAS DOUGLAS FRANCIS FARMER, aged 50, died in St. Mary's Hospital, Montreal, on January 27. Born in the United States, he received his B.A. from Harvard University after which he came to Canada and received his medical degree from McGill University. Dr. Farmer trained at the Royal Victoria Hospital and the St. Luke Hospital, both of Montreal. In World War II he served in the Royal Canadian Navy and since his discharge had practised in the Town of Mount Royal. Dr. Farmer is survived by his widow.

DR. L. E. WENTWORTH IRVING died in Shaughnessy Military Hospital recently at the age of 85. A native of Hamilton, Ont., he received his medical degree from the University of Toronto in 1900. Dr. Irving served as a lieutenant in The Royal Canadian Artillery during the Boer War and took part in the relief of Mafeking. He reached the rank of major and was decorated with the D.S.O., with the Queen's medal and clasps. On discharge he returned to Canada, practising at Walton, Ontario. In 1906 Dr. Irving was appointed medical health officer in Edmonton and subsequently became chief medical officer of Alberta. At the outbreak of hostilities in 1914, Dr. Irving enlisted in the Medical Corps of the Canadian Expeditionary Force. He served for a time in the military hospital at Epsom, England and was promoted to lieutenant-colonel in 1917. He returned to Calgary after the war and became a member of the staff of the Colonel Belcher Hospital. Dr. Irving moved to Vancouver in 1928 and had lived there since that time. His wife predeceased him in 1945.

DR. ROBERT MUIR JOHNSTONE, aged 78, of Piapot, Sask., died on December 25, 1953, after a lengthy illness. Born at Tweedside, Ont., he graduated from the Toronto Medical College in 1904. A pioneer country doctor, he practised medicine in Saskatchewan from 1913 until 1946. He is survived by his widow, one daughter and one son.

DR. JOSEPH HECTOR LAPOINTE, a prominent member of Ottawa's medical fraternity, died on January 13 at the age of 60. Born in Ottawa, he received his B.A. degree from the University of Ottawa in 1912. Four years later he was graduated with a degree in medicine from Laval University. During World War I Dr. Lapointe served overseas with the Royal Canadian Army Medical Corps. Following his discharge he took postgraduate studies in internal medicine in Paris for two years. On his return to Ottawa he joined the staff of the Ottawa General Hospital where he remained for 35 years; he was for many years on the hospital's board of directors. He was for eight years a member of the

Ottawa Board of Health and served as its chairman for two years.

Dr. Lapointe was a Fellow of the Royal College of Surgeons of Canada and a member of the Ottawa Academy of Medicine. He was for two years president of the French Doctors Association of Canada. As president of the Ottawa Medico-Chirurgical Society he was active at various conferences of the Ontario and Canadian Medical Associations. Being active in these various organizations of the medical field, he had made many contributions to medicine. Through the years he had delivered a variety of papers on subjects relating to medicine. He is survived by his widow, one son and one daughter.

DR. HORACE MacINTYRE, aged 65, chief medical advisor to the Toronto Maple Leafs hockey club, died in St. Joseph's Hospital, Toronto, on February 2. A native of Kincardine, Ont., he was a graduate of the medical school of the University of Toronto. Active in sports from childhood, he managed several of the college's junior hockey teams. Dr. MacIntyre served overseas as a battalion medical officer in World War I. On his return he was in charge of the chest clinic at the Christie Street Military Hospital and thousands of veterans passed through his office. Later he went to Sunnybrook Hospital in the same capacity and after his retirement from there he remained active as consultant in chest cases. He was associated with St. Joseph's Hospital for 30 years. He is survived by his widow, a daughter and a son.

DR. PETER C. ROBERTSON, former Mayor of The Pas, died at Brandon on February 14, at the age of 81. Born in Wingham, Ontario, he came as a boy to the Neepawa district. He was educated at Rapid City and Brandon and graduated from Manitoba Medical College in 1909. He practised in Winnipeg, The Pas, Flin Flon and Brandon. While at The Pas he served as chairman of the school board and was coroner and medical officer for the Department of Indian Affairs. At Flin Flon he operated a private hospital. Moving to Brandon he was district coroner from 1942 until his death. He is survived by his widow, one brother and three sisters.

DR. WILLIAM STEPHEN SCHECK, for 44 years a physician and surgeon in Toronto, died at the Toronto Western Hospital on February 1. A native of Hamilton, Ont., he graduated first from the College of Pharmacy and then continued his studies and later graduated from Trinity College, Toronto, with a degree of M.D.C.M. He took postgraduate study in Scotland receiving the degrees of L.R.C.P. and L.R.C.S. from Edinburgh University and L.F.P.S. from the University of Saskatchewan. Returning to Canada, Dr. Scheck established his practice in Toronto in 1910. A number of years ago he was made an honorary life member of the Academy of Medicine. His wife predeceased him.

DR. J. P. FRANK WILLIAMS died at his home in Toronto on February 7. Born in Glen Williams in 1877, he graduated from the University of Toronto in 1900 and established his first practice in Dresden, Ont. In 1919 he moved to Toronto where he practised medicine for more than 50 years, during many of which he served as an associate coroner. Dr. Williams was a member of the Board of Education for seven years and was a former chairman. He was a candidate in the 1943 and 1945 provincial elections. He is survived by his widow and one son.

DR. J. S. BURRIS 1875–1953

AN APPRECIATION

Dr. John Stanley Burris died at the age of 78 in May of 1953. He was one of the real pioneers in modern medical practice in the interior of British Columbia and has left an enviable record of wise, careful medical practice.

He was born in Nova Scotia, the Province which has sent so many of her sons and daughters to win distinction in Western Canada. He graduated in medicine from McGill University in 1899 and practised in Nova Scotia for four years before coming to Kamloops as assistant to the late Dr. A. P. Procter. Here he found hospital facilities already available as the Royal Inland Hospital had been incorporated in 1896. Two years later he took over this practice when Dr. Procter became chief surgeon to the Canadian Pacific Railway at Vancouver. As the community and district developed Dr. Burris gradually associated others with him in building up what is known today as the Burris Clinic. Realizing the importance of the modern developments in both medicine and surgery he studied in England and in Germany during the year 1911 and as he limited his work more and more to surgery he frequently visited the leading Canadian and American centres. As he had a natural aptitude for this work he was soon recognized as one of the outstanding surgeons of the Province and served two terms on the Council of the College of Physicians and Surgeons. He gave up his surgical work in 1946 but continued as coroner until within a few weeks of his death. His first wife (nee Elizabeth Barker) predeceased him in 1937. His second wife (nee Eunice McIntosh) survives as do two daughters.

To the younger practitioner 1903, when Dr. Burris came to British Columbia, is ancient history. In terms of the medical history of this Province it belongs equally to the distant past. In a recent broadcast from Vancouver it was stated that on January 8, 1906 the Vancouver General Hospital, with its forty patients, moved from its old location on Pender Street to the Fairview district. Looking over the Medical Register for 1903 almost all the names are familiar to older practitioners but very few of these appear in the current issue. There were fewer centres which could offer an opening for a medical practitioner, but where medical practices had been established we find the names of many outstanding men. To mention just a few: in Fernie were Dr. Douglas Corsan and Dr. Saul Bonnell; in Cranbrook Dr. J. H. King (now Senator King) and Dr. F. W. Green; in Kamloops Dr. A. P. Procter and Dr. C. A. Tunstall; in New Westminster Dr. R. E. Walker; in Vancouver the old guard was well represented by Dr. David Wilson, Dr. W. J. McGuigan, Dr. W. D. Brydone–Jack and Dr. Simon J. Tunstall, and amongst the younger group were Dr. A. S. Munro, Dr. W. B. Burnet, Dr. Glen Campbell and Dr. W. C. McKechnie; in Victoria Dr. I. W. Powell, Dr. J. C. Davie, Dr. C. J. Fagan, Dr. O. M. Jones and Dr. A. L. Fraser.

In the *Saturday Review of Literature* of January 9, 1954 the leading article is entitled—"The Healer and the Scientist" written by Dr. Dana W. Atchley, Professor of Clinical Medicine at Columbia University. He stresses how much has been and is being accomplished in daily medical practice by the true "healer" through reassurance, sympathy, compassion, intuition and personal understanding while Nature is actually healing the patient's ailment. The greater advances in the medical practice of today, have come through a synthesis of the "healer" with "the scientist in the hospital and the clinician in the laboratory". Dr. J. S. Burris was one of those who helped in this synthesis in this part of Western Canada. Throughout his life he never lost sight of the principle enunciated by Professor Rudolf Virchow—"Medical instruction does not exist to provide individuals with an opportunity of learning how to make a living, but in order to make possible the protection of the health of the public."

H. H. MURPHY

Canad. M. A. J.
April 1954, vol. 70

ABSTRACTS *from current literature*

MEDICINE

Family Outbreaks of Infectious Hepatitis.

BROOKS, B. F., HSIA, D. Y. AND GELLIS, S. S.: NEW ENGLAND J. MED., 249: 58, 1953.

Evidence is presented indicating that gamma globulin has distinct value as a prophylactic agent in members of families where infectious hepatitis occurs. In 17 such families prophylactic injection of gamma globulin was administered to 33 adults and 22 children and only one case of infectious hepatitis developed in this group (jaundice being noted only two days after injection). No gamma globulin was administered to contacts in 29 families, 48% of which developed secondary cases of hepatitis. Frank jaundice developed in 18 out of 51 children who were exposed, but no jaundice was evident among exposed adults.

The authors advocate prophylactic injections of gamma globulin to all sick children exposed to infectious hepatitis. It is questionable whether its use is indicated in healthy children as it may be advisable to allow them to contract the disease and develop an active immunity while still young. NORMAN S. SKINNER

Evaluation of Tubeless Gastric Analysis.

BECKER, F. P. AND MASLON, M.: NEW ENGLAND J. MED., 249: 68, 1953.

Segal and associates in 1950 introduced a tubeless method of determining the presence of free gastric hydrochloric acid. This was based on the release of quininium cation from a synthetic ion-exchange resin by the hydrogen ion in gastric secretion. The subsequent presence of quinine in appreciable amounts in the urine indicated free gastric hydrochloric acid. This original work showed a high degree of accuracy on comparison with previous results obtained with conventional gastric analysis. The present work consists of duplicate tests of routine gastric analysis and administration of two grams of synthetic quinine-bearing resin (Diagnex) to 88 patients. A gastric tube was passed in the fasting patient, a fasting sample aspirated, then subcutaneous histamine injected and a second gastric aspiration done a half-hour later. The patient then was instructed to void and the specimen discarded. The Diagnex was then taken by mouth with water. One hour and two hours later the patient voided and these two specimens (with the specimen voided on awakening to serve as a control) were analyzed for quinine.

Comparison was excellent between the two methods, there being only one discrepancy, the urine failing to show a satisfactory level of quinine in a patient whose gastric analysis indicated free hydrochloric acid. No discrepancy was evident between the two methods in eleven of the patients with achlorhydria. The tubeless method is hence considered an accurate means of determining the presence or absence of free hydrochloric acid in the gastric secretion, but it is not a quantitative method. NORMAN S. SKINNER

Idiopathic Ulcerative Colitis Beginning After the Age of Fifty.

BANKS, B. M. AND KLAYMAN, M. I.: NEW ENGLAND J. MED., 249: 91, 1953.

Review of the records at the Beth Israel Hospital, Boston, from 1941 to 1952 inclusive revealed 20 cases of idiopathic ulcerative colitis which had their onset after the age of fifty years. This formed 10% of all cases of this disease seen at the hospital during the above period. As in younger patients with ulcerative colitis, emotional stress appeared to be an important precipitating factor. Other precipitating causes appeared to be overdose of cathartics, administration of anticoagulants, use of cortisone and repeated catheterization for urinary retention.

The onset in these older patients was often deceptively mild and the symptoms were often less than would be expected with the pathological changes demonstrated in the colon. Of the 20 patients 11 responded to medical treatment (10 of these remaining well over a period of observation now extending to almost six years on an average, the other succumbing to a second attack). Nine patients required surgery, 5 on their initial admission and 4 after two to nine admissions. Three operative deaths occurred from peritonitis and related complications, one died three years later from uræmia, and the remaining 5 have remained free of colitis. The authors conclude that idiopathic ulcerative colitis having its onset after the age of fifty is more common and more serious than is generally recognized. NORMAN S. SKINNER

SURGERY

Some Common Denominators in 1200 Cases of Cardiac Arrest.

STEPHENSON, H. E., REID, L. C. AND HINTON, J. W.: ANN. SURG., 137: 731, 1953.

Data from surgeons in the United States, Canada, Australia, England, Ireland, France and Puerto Rico enabled the authors to gather 1,200 cases of cardiac arrest. Many failures occurred because of delay, inadequate knowledge and equipment. The necessity for a prepared plan of action to meet the emergency is clear. Estimates of the frequency of cardiac arrest vary from one fatality in 858 to one in 5,000 operations, and 5.5% in operations for pulmonary stenosis. Many believe that its incidence is increasing. The present data indicate a sex incidence of 61% male to 39% females, though slightly more than half of all operations are on females. More cases occurred in the first decade of life than any other. Ages varied from two days to 92 years. In the series 14% occurred outside the operating room in places such as the labour room, x-ray department, on a stretcher, in the fracture room and on the ward, and of these 17% were permanently resuscitated.

Of the 1,200 cases, 28% survived and of these 94% had cardiac massage within 4 minutes. The severity of neurologic complications varies in proportion to the delay between arrest and massage. Frequently cardiac arrest occurred without clinical signs of anoxia and there was much evidence to support the vago-vagal reflex theory. A high proportion occurred during endotracheal intubation. Many had several anæsthetic agents. Of those who died, 87% failed to survive 24 hours. Only 8 of the 1,200 survived as "decerebrates". It was frequently reported that many with cortical damage improved in several months.

The thoracic approach seemed to give better results and the advantages are discussed. Sixty to eighty times per minute is the rate of massage recommended. A mobile cardiac resuscitation unit as used at Bellevue Hospital is described. BURNS PLEWES

Cancer as a Chronic Disease.

MORTON, J. J. AND MORTON, J. H.: ANN. SURG., 137: 683, 1953.

Out of a long experience at Rochester, N.Y., 17 cases of proved cancer originating in various organs are reviewed, each having long periods of useful survival although malignant disease was still present. Several cases of metastatic carcinoma of the thyroid showing no clinical evidence of the primary tumour illustrate "cancer, latent, metastasizing". Cases of long survivals (19 and 20 years) of carcinoma of kidney, and breast with eventual recurrences are given. Malignant melanomas of the orbit with multiple operations for recurrences

then apparently became quiescent for 6 years after removal of a secondary from the brain, and for 19 years after two radical mastectomies and two block dissections of the neck. Salivary tumours are often very slow to metastasize. Even patients with diffuse involvement of the peritoneum and viscera may survive comfortably for many years as illustrated by cases of carcinoma of the adrenal, lung and other organs.

Because of the differing response of individuals to cancer, the physician should be cautious in estimating the survival of any patient suffering from carcinoma.

BURNS PLEWES

An Appraisal of Surgical Treatment of Gastric Malignancy.

KIRSCHNER, P. A. AND GARLOCK, J. H.: ANN. SURG., 138: 1, 1953.

The argument for and against total gastrectomy for carcinoma of the stomach is presented. In a review of 283 patients operated upon from 1937 to 1951, 161 had sub-total and 24 had total gastrectomy. In both types of operation the abdomino-thoracic exposure is used increasingly, and in both the tail of the pancreas and spleen were often removed.

In the subtotal gastrectomy group 27% survived 5 years and in the total gastrectomy group there was not one long-term survival. Besides, the morbidity rate is very high after total gastrectomy and most become emaciated digestive cripples. Varying biological behaviour in cancer seems to be an important factor in determining the final results of surgical operations for its treatment. Subtotal gastrectomy is recommended as the procedure of choice.

BURNS PLEWES

The Response of Prostatic Carcinoma to Œstrogen Treatment.

FERGUSON, J. D. AND FRANKS, L. M.: BRIT. J. SURG., 40: 442, 1953.

Using needle biopsy material from 33 patients during treatment or at autopsy the histological changes after œstrogen therapy was demonstrated. Tumour cells but not normal tissues eventually lose their sensitivity to the hormone. Even in cases showing a marked histological response to œstrogens there are always surviving tumour cells. Prognosis following treatment is independent of the degree of differentiation or anaplasia. A breast response to œstrogens is often associated with a good clinical response. It is felt that the optimum dosage of œstrogens is higher than that generally used and the treatment period should be two or three weeks.

BURNS PLEWES

Definitive Treatment of Fresh Injuries to Large Blood Vessels.

CRAWLEY, J. J. AND HERRMANN, L. G.: ARCH. SURG., 67: 153, 1953.

Recent work on the innervation and response of arteries to injury is reviewed to point out important clinical applications. If occlusion of an artery by compression is relieved, as by reduction of a fracture or fasciotomy, before thrombosis occurs, its function is unimpaired. Contusion of an artery results in local constriction independently of extrinsic nerve supply and depends on the amount of smooth muscle present so that it is difficult to demonstrate in the aorta. Intrinsic tone of the arterial wall results in expansion with increase and shrinking with decrease of the contained fluid. Thus the small diameter beyond an occlusion of an artery is not necessarily evidence of spasm. Spasm is usually due to local irritation and is relieved by removal of the irritant or local resection of the artery. Papaverine is an additional locally effective agent.

The dangers of ischæmic necrosis in the progression of clotting in arteries and of pulmonary embolism when veins are involved are discussed. Operations to repair blood vessels and remove irritants or compression should be done within 6 to 8 hours but may be successful even up to 24 hours. Tourniquets may save life at the expense of loss of limb. A finger for direct pressure to control hæmorrhage from a large vessel is better than the blind use of a hæmostat. It seems more important to try to repair an artery that is torn by a crushing injury where collaterals are also probably damaged than when the injury is due to a small incised wound. Various arteries are classified according to the safety of ligation and the necessity for restoration of continuity by suture or graft or prosthesis.

The techniques involved are described. Sympathectomy is sometimes indicated. Heparin is usually used locally. Vasoconstricting drugs should be avoided. External heat is dangerous to the involved part and cold is also contraindicated. Postoperative hypotension must be avoided.

BURNS PLEWES

OBSTETRICS AND GYNÆCOLOGY

The Importance of the Psychologic Factor in Gynæcology.

MENZER, D.: NEW ENGLAND J. MED., 249: 519, 1953.

Psychiatric investigation of women with disorders of menstruation is being carried out at a gynæcological-psychiatric unit located at the Peter Bent Brigham Hospital, Boston. So far each patient studied has had a definite emotional conflict, often expressed as an excessive drive toward independence and activity between periods alternating with a childish dependency during menstruation. The woman with functional amenorrhœa or oligomenorrhœa finds the sexual and reproductive roles of a woman's life consciously unacceptable, femininity being rejected in favour of masculine behaviour or the idea of sex being associated with the sordid and forbidden. At the same time a deep wish to be a normal woman and mother may be present at the unconscious level. Psychotherapy is of great value not only for the correction of the emotional imbalance but also for the improvement of the menstrual abnormality.

The psychologic factor is very important in gynæcology and further research is necessary to determine how, where and to what extent emotions and attitudes influence the delicate physiological balance essential to normal functioning of the female sexual and reproductive system.

NORMAN S. SKINNER

Observations on the Pathogenesis of Premature Separation of the Normally Implanted Placenta.

MENGERT, W. F., GOODSON, J. H., CAMPBELL, R. G. AND HAYNES, D. M.: AM. J. OBST. AND GYNEC., 66: 1104, 1953.

Placental abruption was produced in each of two women at or near term, during the course of Cæsarean hysterectomy, by the simple expedient of digital compression for five minutes of the vena cava below the level of the renal veins. Probably this is the first time placental abruption has ever been deliberately produced in the human being. Both mothers and children survived and are doing well.

ROSS MITCHELL

Pregnancy Following Major Thoracic Surgery for Tuberculosis.

FOLSOME, C. E. AND KUNTZE, C. D.: AM. J. OBST. AND GYNEC., 65: 1319, 1953.

Pulmonary tuberculosis can be treated prior to or during pregnancy with major thoracic surgery without jeopardizing the pregnancy. Major thoracic surgery for pulmonary tuberculosis prior to or during pregnancy is not an indication for therapeutic abortion. The course of labour, the management of delivery, and the prognosis for the

Canad. M. A. J.
April 1954, vol. 70

infant do not differ from those in the tubercular patient who has not undergone such surgery.

The evidence seems to indicate that lung resection is a more favourable procedure than thoracoplasty with regard to the maternal outcome in pregnancy.

ROSS MITCHELL

Association Between Period of Gestation and Length of Menstrual Cycle.

McKEOWN, T., GIBSON, J. R. AND DOUGRAY, T.: BRIT. M. J., 2: 253, 1953.

The association between the period of gestation and the length of the menstrual cycle has been investigated in 1,227 women whose menstrual history was recorded for one year after the birth of a child. The data were considered adequate for 716 women with regular cycles. It is shown that the period of amenorrhœa (from the onset of menstruation to birth) increases by about a day for each additional day in the length of the cycle.

It is suggested that variation in the period of amenorrhœa according to the length of the menstrual cycle is determined by variation in the interval between the onset of menstruation and ovulation. If this is so, the period between ovulation and birth seems to be independent of the length of the cycle. ROSS MITCHELL

THERAPEUTICS

Serum Concentrations of Penicillin Following Administration of Various Preparations of Dibenzylethylenediamine Dipenicillin G (DBED Penicillin).

WELCH, H., RANDALL, W. A. AND HENDRICKS, F. D.: ANTIBIOTICS AND CHEMOTHERAPY, 3: 1053, 1953.

Dibenzylethylenediamine dipenicillin (DBED penicillin) is a relatively insoluble, practically tasteless, stable salt of penicillin. Its stability in aqueous suspension has made it possible for the first time to use an oral suspension. When given by mouth, DBED penicillin is readily absorbed and gives penicillin blood concentrations corresponding in a general way to those obtained with crystalline potassium penicillin or procaine penicillin. When injected intramuscularly, it remains in the blood longer than any other available form of penicillin. Because of its prolonged though low blood concentration, it is particularly useful in the treatment of diseases caused by organisms which are especially sensitive to penicillin, including gonorrhœa, syphilis, yaws and streptococcal infections. It may be used in the prophylaxis of rheumatic fever.

Over a period of several months, a variety of DBED penicillin preparations by mouth and by injection were studied and the blood concentrations in human subjects were determined. Subjects receiving 300,000 units intramuscularly showed satisfactory penicillin blood concentrations for five days in 100% of the cases and for ten days in more than 60%. When 600,000 units were injected intramuscularly from a cartridge, children, aged 5 to 12 years, showed a more consistently positive blood concentration of penicillin than adults; 100% of the children had a penicillinæmia for 16 days following administration.

The addition of procaine penicillin to DBED penicillin increased the penicillin blood concentration within one hour to about seven times that of DBED penicillin alone; at 6 hours, the level was nearly four times that of DBED penicillin, but from one day on, the blood concentration of penicillin was accounted for by the delayed absorption of DBED penicillin. In this experiment the majority of subjects had penicillin in the blood for eleven days.

In contrast to the prolonged penicillinæmia obtained by intramuscular injection of DBED penicillin, oral administration does not result in a comparable prolongation of serum concentrations. Following the administration of 200,000 units of DBED penicillin by mouth, slightly more than half of the subjects showed significant blood concentrations for eight hours. When the initial dose of 200,000 units was followed after six hours by another 200,000 units, penicillin concentrations determined two, four, and six hours after the second dose were found not to be significantly elevated over those obtained with a single 200,000 unit tablet, but it is noteworthy that 90 to 100% of the subjects had penicillin in their blood six hours after administration, *i.e.*, just preceding a subsequent dose. Investigation of higher dosage schedules, 250,000 to 750,000 units, showed that as the dose increased, the average height of penicillin concentration in the blood increased at half-hour, one-and-a-half hour, two-and-a-half hour, three-and-a-half hour and four-and-a-half hours for all doses. Thereafter, the average penicillin level of the 250,000 unit group declined to zero at the tenth hour, while the average for the 500,000 and 750,000 unit groups remained a positive figure to the end of the twelfth hour.

An ideal penicillin preparation should produce a high initial blood concentration, sufficient to penetrate areas of infection where the blood supply is impaired, and it should maintain a satisfactory blood concentration for a long enough period of time to eradicate the infection. A mixture consisting of 300,000 units of crystalline potassium penicillin G to provide the initial high level, 300,000 units of crystalline procaine penicillin G to maintain a significant concentration for about one day, and 300,000 units of DBED penicillin to prolong the penicillin blood concentration to prevent a possible resurgence of the infection, was administered intramuscularly. This resulted in higher initial blood concentration without impairing the slow absorption of DBED penicillin.

B. L. FRANK

PÆDIATRICS

Natal Day Deaths.

BUNDENSEN, H. N.: J. A. M. A., 153: 466, 1953.

Study of 10,000 neonatal deaths in Chicago from 1936-1949, shows that too many infants continue to die needlessly, especially during the early and critical days of life. Since some 86% are hospital deliveries (96% in Chicago) the immediate responsibility for reduction and prevention becomes the co-operative efforts of the physician, hospital administrator, and nurses.

The author expresses satisfaction that Chicago had the lowest infant mortality rate of the U.S. for the period 1940-1949. However, he believes that this satisfaction obscured the facts until this study was made. Here it is learned that although there is a reduction of 92 infant deaths per 1,000 live births over a 40 year period, there was only a reduction of 2 per 1,000 live births on the critical natal day. This means that the reduction occurred after the natal day and neonatal period.

In 1952, 35.6% of infant deaths (under 1 year) occurred on the natal day: 60% of these infants weighing less than 1,500 grams. Causes of death in these smallest babies were found to be either (1) abnormal pulmonary ventilation, or (2) birth injuries. The first classification includes all infants who, on post mortem, show no specific pathological lesions except those in the lungs, *i.e.*, atelectasis, or immaturity of the lungs. Over one-half the deaths occurred here. In the second classification, the injuries were mainly due to intracranial hæmorrhage. Approximately 20% of these fatalities were traced to this cause.

The author believes that neonatal deaths should be classified differently, mainly because cause of death is related to time.

Besides noting deaths by age, weight and cause he suggests a time classification as follows: (1) Natal day; causes mainly ventilation abnormalities and injuries. (2) Triediem. (3) Hebdomadal; infection and blood dyscrasias take precedence during this period. (4) Post-hebdomadal; infections and malformations increase after 1st week.

ISABEL M. LAUDER

INDUSTRIAL MEDICINE

Human Relations in Occupational Health.

CAMERON, D. C.: PUB. HEALTH REP., 67: 686, 1952.

"It is important not only what you do, but how you do it". This concept is the basis of good human relations, *i.e.*, good interpersonal contacts between individuals or groups of individuals. That the practice of good human relations should be an integral part of an occupational health program is stressed by the author. In his opinion it has an important bearing on the success with which plans are executed for the selection and placement of workers, the prevention of illness and absenteeism, the provision of medical care, and the fostering of health.

After indicating the health effects of human relations in industry as revealed by certain absenteeism records (due to emotional disturbances and due to poor supervision) the author discusses the role of the health department in approaching this problem. He emphasizes the need for proper understanding of attitude and behaviour and for realization of the fact that the health of workers is intimately related to the things that go on not only in the plant or business, but also in the home, the community and the nation.

What is required today is a little systematic thought about the basic needs of people and how these needs may be satisfied in the work situation. Some of the outstanding basic needs, which are present in some degree in most individuals, are: consideration, recognition of job status—from their families as well as from their fellow workers—job satisfaction, pay, and security. Gratification of these needs depends in turn, on other human characteristics such as working habits or attitude towards responsibility.

Many individuals with basic needs unsatisfied, appear with increasing frequency in the physician's office or on the sick absence list. The occupational health department, therefore, cannot fail to be interested in removal of the etiologic factors in the plant.

To attain satisfactory job placement, analysis of the psychological requirements of the job is needed with assessment of the psychological characteristics of the man to do it. A certain amount of follow-up also is essential, not only to evaluate and improve selection and placement techniques, but also to detect quickly any errors in placement so that a more suitable position may be found. To this end, the people in the health and personnel departments, as well as those in management, should have an intimate knowledge of the plant and working conditions, should know as many of the workers as possible, and should have a genuine interest in people.

MARGARET H. WILTON

Medical Significance of Illness and Absence in an Industrial Population.

PLUMMER, N. AND HINKLE, L. E. JR.: ANN. INT. MED., 39: 103, 1953.

That industry is confronted with an increasingly serious problem in dealing with the high-absence employee is indicated in this article. It shows also the implications involved for our society and our economy. A recent statistical study of the absences of women employees throughout their working careers drew attention to the characteristic absence pattern of an individual. In the present report the authors describe in detail characteristics of the average low-absence person compared with those of the average high-absence person and point out some of the medical, industrial and sociologic implications of their studies.

In making the comparison, 40 employees were selected for intensive study, all of whom had more than 20 years of service. Twenty of them had shown low-absence throughout employment and 20 had shown high. In each case a critical analysis was made of: administrative data, such as absence, transfers, etc., data obtained frim confidential medical department records including reports of private physicians and hospitals, and data concerning background and present life situation derived from an interview with one of the doctors in the medical department supplemented wherever possible by physical examination and other studies.

From the findings it was possible to present pictures of the average low-absence woman employee (L.A.) and the average high-absence woman employee (H.A.). In addition to the medical histories outlined the authors compare the two types in other ways. The low-absence employee (L.A.) was found to be a happy and contented individual, readily adaptable and well-liked by associates and supervisor. The average high-absence employee (H.A.) was unhappy, discontented and resentful, with few friends; she was not liked by associates or supervisor.

The authors then suggest how the medical department should cope with the problem of the high-absence employee (H.A.). (1) The high-absence cases should be recognized early. In this connection accurate attendance records and careful interviews are important. (2) The high-absence cases when recognized should be fully evaluated. (3) These high-absence employees must be studied and managed. This involves what industry today calls its human relations program.

Reference is made also to the role of the private physician. For him the initial problem is the same as for the doctor in industry, namely, early recognition of the case and a proper understanding of the disease. He should put emphasis on treating the underlying disorder.

MARGARET H. WILTON

FORTHCOMING MEETINGS

CANADA

ONTARIO MEDICAL ASSOCIATION, Annual Meeting, Toronto, Ont. (Dr. Glenn Sawyer, 244 St. George Street, Toronto 5, Ont.) May 10-14, 1954.

CANADIAN UROLOGICAL ASSOCIATION, Annual Meeting, Thousand Islands Club, Ont. (Secretary, Dr. S. A. MacDonald, 1414 Drummond St., Montreal, Que.) June 3-5, 1954.

CANADIAN NURSES' ASSOCIATION, 27th Biennial Meeting, Banff Springs Hotel. (Canadian Nurses' Association, National Office, Room 401, 1411 Crescent Street, Montreal, Que.) June 7-11, 1954.

INTERNATIONAL CONGRESS OF PSYCHOLOGY, Montreal, Que. (Prof. H. S. Langfeld, International Union of Scientific Psychology, Eno Hall, Princeton University, Princeton, N.J.) June 7-12, 1954.

SOCIETY OF OBSTETRICIANS AND GYNÆCOLOGISTS OF CANADA, Annual Meeting, Harrison Hot Springs, B.C. (Dr. R. B. Meiklejohn, Secretary, Toronto Western Hospital, Toronto, Ont.) June 10-13, 1954.

CANADIAN MEDICAL ASSOCIATION, Annual Meeting, Vancouver, B.C. (Dr. T. C. Routley, General-Secretary, 244 St. George Street, Toronto 5, Ont.) June 14-18, 1954.

CANADIAN TUBERCULOSIS ASSOCIATION, Saint John, N.B. (Dr. G. J. Wherrett, Executive Secretary, Canadian Tuberculosis Association, 265 Elgin Street, Ottawa 4, Ont.) June 24-26, 1954.

INTERNATIONAL CONFERENCE ON GROUP PSYCHOTHERAPY, Toronto, Ont. (Dr. Wilfred C. Hulse, Chairman, International Committee on Group Psychotherapy, 110 West 96th Street, New York 25, N.Y.) August 12-19, 1954.

Canad. M. A. J.
April 1954, vol. 70

INTERNATIONAL CONGRESS ON CHILD PSYCHIATRY, University of Toronto, Toronto, Ont. (Miss Helen Speyer, Executive Officer, International Association for Child Psychiatry, 1790 Broadway, New York 19, N.Y.) August 13-14, 1954.

INTERNATIONAL CONGRESS ON MENTAL HEALTH, University of Toronto, Toronto, Ont. (The Executive Officer, Fifth International Congress on Mental Health, 111 St. George Street, Toronto, Ont.) August 14-21, 1954.

INTERNATIONAL CONGRESS OF OPHTHALMOLOGY, Montreal, Que. (Dr. G. Stuart Ramsey, Associate Secretary, Physical Sciences Centre, McGill University, Montreal 2, Que.) September 9-11, 1954.

INDUSTRIAL MEDICAL ASSOCIATION OF THE PROVINCE OF QUEBEC, AND THE INDUSTRIAL SECTION OF THE ONTARIO MEDICAL ASSOCIATION, Joint Meeting, Ottawa, Ont. (Dr. W. F. Prendergast, Secretary of the Section of Industrial Medicine, 22 Commercial Road, Leaside, Toronto 17, Ont.) September 23-25, 1954.

UNITED STATES

ANNUAL SYMPOSIUM ON RECENT ADVANCES IN THE STUDY OF VENEREAL DISEASES, Washington, D.C. (Dr. James K. Shafer, Public Health Service, Washington 25, D.C.) April 29-30, 1954.

EASTERN STATES HEALTH EDUCATION CONFERENCE OF THE NEW YORK ACADEMY OF MEDICINE, New York City (Dr. Iago Galdston, Executive Secretary, The New York Academy of Medicine, 2 East 103 Street, New York 29, N.Y.) April 29-30, 1954.

AMERICAN GOITER ASSOCIATION, Annual Meeting, Boston, Mass. (Dr. John C. McClintock, Corresponding and Recording Secretary, 149½ Washington Ave., Albany, N.Y.) April 29 - May 1, 1954.

CONFERENCE OF CATHOLIC SCHOOLS OF NURSING, Annual Meeting, Atlantic City, N.J. (Executive Office, 1438 South Grand Blvd., St. Louis 4, Mo.) May 15-16, 1954.

CATHOLIC HOSPITAL ASSOCIATION, Annual Convention, Atlantic City, N.J. (Executive Office, 1438 South Grand Blvd., St. Louis 4, Mo.) May 17-20, 1954.

AMERICAN TRUDEAU SOCIETY, Medical Section of the National Tuberculosis Association, Annual Meeting, Atlantic City, N.J. (Chairman of the Medical Sessions Committee, American Trudeau Society, 1790 Broadway, New York 19, N.Y.) May 17-21, 1954.

AMERICAN UROLOGICAL ASSOCIATION, Annual Meeting, New York, N.Y. (Dr. William P. Didusch, Executive Secretary, 1120 N. Charles Street, Baltimore 1, Md.) May 31-June 3, 1954.

NATIONAL CONVENTION OF THE AMERICAN SOCIETY OF MEDICAL TECHNOLOGISTS, Annual Convention, Miami Beach, Florida. (Mrs. Maxine T. Ace and Mrs. Anna L. Rundell, Co-chairman, Publicity Committee, Jackson Memorial Hospital, Miami, Florida) June 13-17, 1954.

AMERICAN GERIATRICS SOCIETY, Annual Meeting, San Francisco, Calif. (Dr. W. O. Thompson, President, 700 North Michigan Ave., Chicago 11, Ill.) June 17-19, 1954.

AMERICAN COLLEGE OF CHEST PHYSICIANS, Annual Meeting, San Francisco, Calif. (Dr. Edgar Mayer, Chairman of the Committee on Scientific Program, 850 Fifth Avenue, New York 21, N.Y.) June 17-20, 1954.

AMERICAN MEDICAL ASSOCIATION, Annual Meeting, San Francisco, Calif. (Dr. George F. Lull, 535 North Dearborn Street, Chicago 10, Ill.) June 21-25, 1954.

ANNUAL SYMPOSIUM ON TUBERCULOSIS AND OTHER CHRONIC PULMONARY DISEASES FOR GENERAL PRACTITIONERS, Saranac Lake, N.Y. (Dr. Richard P. Bellaire, P.O. Box 2, Saranac Lake, N.Y.) July 12-16, 1954.

INTERNATIONAL CONGRESS OF OPHTHALMOLOGY, New York, N.Y. (Dr. William L. Benedict, Secretary-General, 100 First Avenue Building, Rochester, Minn.) September 12-17, 1954.

WORLD CONGRESS OF CARDIOLOGY, Washington, D.C. (Dr. L. W. Gorham, Secretary-General, Second World Congress of Cardiology, 44 East 23rd Street, New York 10, N.Y.) September 12-17, 1954.

INTERNATIONAL ANÆSTHESIA RESEARCH SOCIETY, Annual Congress, Los Angeles, Calif. (Dr. T. H. Seldon, Chairman, 102-110 Second Avenue, S.W., Rochester, Minn.) October 4-7, 1954.

OTHER COUNTRIES

INTERNATIONAL CONGRESS OF INTERNATIONAL COLLEGE OF SURGEONS, Sao Paulo, Brazil. (Dr. Max Thorek, Secretary-General, 1516 Lake Shore Drive, Chicago, Ill.) April 26-May 2, 1954.

IRISH MEDICAL ASSOCIATION, Annual Meeting, Killarney, Ireland. (Dr. P. J. Delaney, Medical Secretary, 10, Fitzwilliam Place, Dublin) July 7-10, 1954.

INTERNATIONAL GERONTOLOGICAL CONGRESS, London and Oxford, England. (Prof. R. E. Tunbridge, President, Department of Medicine, The University, Leeds, England) July 12-22, 1954.

INTERNATIONAL CONGRESS ON THROMBOSIS AND EMBOLISM, Basle, Switzerland. (Dr. W. Merz, Hon. Secretary, Gynæcological Clinic, University of Basle, Switzerland) July 15-19, 1954.

INTERNATIONAL CONGRESS FOR PSYCHOTHERAPY, Zürich, Switzerland. (Dr. H. K. Fierz, Secretary General, Theaterstrasse 12, Zürich 1, Switzerland) July 21-24, 1954.

INTERNATIONAL CANCER CONGRESS, Sao Paulo, Brazil. (Prof. A. Prudente, 171 rua Benjamin Constante, Sao Paulo, Brazil) July 23-29, 1954.

INTERNATIONAL CONGRESS ON OBSTETRICS AND GYNÆCOLOGY, Geneva, Switzerland. (Dr. H. de Watteville, President, Maternité Hôpital Cantonal, Geneva, Switzerland) July 26-31, 1954.

INTERNATIONAL CONGRESS OF INTERNAL MEDICINE, Stockholm, Sweden. (Secretariat of the Third International Congress of International Medicine, Karolinska sjukhuset, Stockholm 60, Sweden) September 15-18, 1954.

CONFERENCE OF THE INTERNATIONAL UNION AGAINST TUBERCULOSIS, Madrid, Spain. (Prof. Alix y Alix, Escuela di Tisiologia, Ciudad Universitaria, Madrid, Spain) September 26 - October 2, 1954.

PAN-PACIFIC SURGICAL ASSOCIATION, Congress, Honolulu, Hawaii. (Dr. F. J. Pinkerton, Director General, Pan-Pacific Surgical Association, Young Building, Honolulu, Hawaii) October 7-8, 1954.

JAPAN MEDICAL CONGRESS, Kyoto, Japan. (Dr. M. Goto, Secretary General, University Hospital, Medical Faculty of Kyoto University, Kyoto, Japan) April 1-5, 1955.

NEWS ITEMS

ALBERTA

The Society of Anæsthesiologists of Western Canada, held their annual meeting in Edmonton on February 26 and 27 inclusive. Many fine papers were presented and some seventy members attended from the four provinces.

The Alumni Association of the University of Alberta held their annual get-together in and about the University. The ball was held at the MacDonald hotel, there being some five hundred couples in attendance. The class of '29 was so featured that few will forget this great event in the life of the University.

We regret to announce the passing of Dr. G. D. Stanley of Calgary. Further notification will be forthcoming.

A number of doctors of the province are taking special courses relating to the treatment of poliomyelitis. The courses are held at the Royal Alexandra hospital.

The Surgical Society of Western Canada is holding its annual meeting in Edmonton, this being an alternate with Winnipeg. March 5 and 6 inclusive will be the dates this year. A full attendance is anticipated. Many of the Alberta doctors have an opportunity to see the cream of the Dominion curlers in action as the great meet is held in Edmonton.

Many Alberta men will be attending the Dominion Medical in Vancouver this summer. Those who have hobbies should present them there.

W. CARLETON WHITESIDE

BRITISH COLUMBIA

The B.C. Division, Canadian Arthritis and Rheumatism Society, through its provincial secretary, Miss Mary Pack, reports 18 districts in B.C. now covered by the C.A.R.S. These have trained physiotherapists who give treatment at hospitals and in private homes. A drive is on for a fund in support of the work of the Division.

Dr. A. M. Menzies, assistant senior Medical Health Officer for Vancouver, will retire from city service on April 7. He has been with the city for 18 years, but prior to this was provincial epidemiologist for five years. Dr. Menzies is a University of Manitoba graduate, and served in the 12th Field Ambulance during World War I. He started practice at Britannia Beach, where a disastrous flood in 1921 killed 36 people and Dr. Menzies had his hands full.

Membership in the B.C. Division, Canadian Red Cross, now stands at 211,624, the highest in the division's history. In the past year there has been an increase of 41,983, 17,000 from Vancouver alone. Forty-nine thousand bottles of blood were collected in 1953. There is a great demand for blood for the production of gamma globulin for use against polio.

Dr. Dodd Q. Chu of Vancouver has been awarded a teaching fellowship at McGill: this fellowship is worth $2,000.00. Dr. Chu has been doing research in allergy problems.

The Annual Medical Ball of the University of B.C. was held in the Hotel Vancouver on March 26. This Ball was the fourth of its kind, and is unique in that the proceeds are devoted to providing $100.00 bursaries for students in need of help, or for other reasons. The Ball was highlighted by the appearance of the graduating class of '54, the first medical graduates from the University of British Columbia.

While we are on the subject of the Medical School, it is a matter of great interest, and considerable pride on the part of all concerned, that the Medical School of the University of British Columbia, has been given Grade A status, with no reservations and no criticisms, by the Council of Education of the American Medical Association.

The Scientific Session of the General Practitioners' Section of the Canadian Medical Association, B.C. Division, will be held at Harrison Hot Springs Hotel on March 18, 19, and 20. All available rooms have been taken, and a large attendance is certain. The program is an excellent one, and a dinner will be held on Saturday night, when Dr. Appleby of Vancouver will give an address.

The Burnaby General Hospital, which has been in operation for the past year, reports a very successful year. There is an operating surplus of $8,951.00 for the twelve months. This would be unique in any reports of hospitals—but there is a qualifying remark, "before depreciation allowances". That sounds more natural.

There is, one is not surprised to hear, need for increased bed accommodation, and we understand plans are on foot to enlarge the hospital. There was an 81.2% total occupancy, and the medical side showed a 92% occupancy. There were 44,790 patient days with an average stay of 7.47 days.

Dr. Duncan C. Mackenzie, a former eye, ear, nose and throat specialist in Vancouver died on February 21 at the age of 79. He came to B.C. in 1920, and started practice in Vancouver in 1924. He retired on account of ill-health in 1942.

The Annual Report of the Victorian Order of Nurses, held recently, brought out very forcibly the value of home nursing, and the valuable work this organization is doing. Dr. William Gibson, of the U.B.C., Medical faculty, was guest speaker, and he used the experience of New Zealand to point up his argument that home nursing can do a great deal to lessen use of hospital beds, and so ease the acute hospitalization problem in B.C. He referred to the work of the Order in lessening infant mortality, and in combating juvenile delinquency by spotting early signs of anti-social behaviour. The reports of the Order showed 62,469 visits made in 1953 in greater Vancouver, nearly half of these patients over 70 years of age. Mrs. Paul Smith, M.B.E. was elected President for 1954. Mrs. Smith is a former M.L.A. of B.C.

J. H. MACDERMOT

MANITOBA

The new infirmary of the provincial hospital for mental diseases at Selkirk, Manitoba, was opened on February 11 by Hon. F. C. Bell, Minister of Health. It will provide 300 more beds and is one of the most modern of its kind in Canada. The total cost of building and furnishings is over $1,000,000.

Dr. C. E. Corrigan reviewed in the *Winnipeg Free Press* of February 6 the Official History of the Canadian Medical Services 1939-1945, Volume 2, edited by W. R. Feasby, M.D.

At a public symposium sponsored by the St. James, St. Vital and Fort Garry Health Unit in St. James Collegiate in connection with Public Health week, the speakers included K. O. Mackenzie, deputy minister of public welfare, Dr. H. R. Stewart, director of dental services, S. C. Sparling, executive director of the Society of Crippled Children in Manitoba, and Dr. Morley Elliott, deputy minister of health. Dr. Elliott who was a delegate to the World Health Organization's Assembly in Geneva last spring said that W.H.O. now has 82 member nations of which Canada was one of the foundation group and has three Canadians on the Executive.

Dr. F. A. L. Mathewson, assistant professor of medicine and medical director of the Great-West Life Assurance Company, addressed the Life Underwriters Association of Manitoba on February 10 at the Royal Alexandra Hotel.

North of 53 District Medical Society met in Flin Flon on February 10 and 11 with Dr. H. L. McNichol as President and Dr. P. Johnson, Secretary. A group of Winnipeg doctors attended—Dr. W. F. Tisdale, President Manitoba Medical Association, Dr. G. L. Bell, Dean of the Faculty of Medicine, Dr. Dwight Parkinson, Dr. M. T. MacFarland and Dr. Digby Wheeler. Dr. Bell spoke on Trends in Medical Education and Dr. Parkinson on Treatment of Acute Head Injuries. On February 11 ward rounds were made in the hospital of the Hudson Bay Mining and Smelting Company and in the General Hospital conducted by the Grey Nuns. The new president of the District Medical Society is Dr. C. S. Crawford, The Pas.

A cobalt therapy unit will be installed in St. Boniface Hospital in the near future. It is expected that the cost of constructing a building for its storage will be met by the service clubs of St. Boniface.

The first sod in connection with the $2,500,000 extension to Misericordia Hospital was turned on February 15, by Archbishop Philip F. Pocock of Winnipeg. The wing will house an additional 300 beds.

A team of Canadian and American experts in Arctic medical research assembled in Winnipeg on February 20 for a trip to Churchill to further their research. The Churchill project is being carried out under the Josiah Macy Foundation for Medical Research in co-operation with the Canadian Defence Research Board. The team is headed by Dr. John H. Talbot, University of Buffalo. Canadian research men are Dr. L. P. Dugal of Laval University, Dr. G. M. Brown of Queen's University and Dr. J. A. F. Stevenson, University of Western Ontario. Accompanying the team are Dr. A. C. Burton, University of Western Ontario and two American women, Dr. Janet Travell and Dr. Irene Ferrer. ROSS MITCHELL

NEW BRUNSWICK

Dr. J. A. MacMillan of Charlottetown was the invited speaker at the January meeting of the Saint John Medical Society. He spoke on the general topic of "Insurability of Medical Risks". Following the address, a general and rather far-ranging discussion of Blue Cross and Blue Shield coverage was undertaken by several doctors, sometimes in a critical attitude. Dr. MacMillan answered in his own brilliant manner and in most cases his answers were supported by readily available figures and facts. His visit was fully appreciated and enjoyed by a large audience.

Dr. J. A. Caskey, Radiotherapist at the Saint John General Hospital appeared before the Charlottetown Medical Society on January 27, presenting a paper on "The Diagnosis and Treatment of Curable Cancer," illustrated by excellent lantern slides. His return to the mainland was delayed by an old-fashioned blizzard which immobilized road traffic for several days. The good old days may be gone forever, but natural forces have not changed and snow, plus wind, still make drifts which our present day mechanical toys find difficulty in overcoming.

The New Brunswick Medical Society, in co-operation with the Post-Graduate Committee of Dalhousie University, arranged for Dr. Douglas E. Cannell, Professor of Obstetrics and Gynæcology, University of Toronto, to present a paper on "Problems of Difficult Labours" to the Moncton Medical Society in the New Moncton Hospital. Dr. Cannell was greeted by a large audience which was augmented by a small delegation from Saint John. Dr. K. W. Mackenzie was chairman.

The Spring Clinical Session of the Saint John Medical Society will have as special speakers Dr. Charles A. Janeway, Professor of Pædiatrics, Harvard University and Dr. Norman F. Miller, Professor of Obstetrics and Gynæcology, University of Michigan.

Madawaska Medical Society elected officers for 1954, as follows: President, Dr. L. E. Belanger; Vice-President, Dr. Darius Albert; Secretary, Dr. Guy Tardiff.

Officers for 1954 of the York-Sunbury-Queens Medical Society are: President, Dr. J. Alex Bell, Fredericton; Vice-President, Dr. George Fletcher, Harvey; Secretary-Treasurer, Dr. J. A. Williamson, Fredericton; Executive, Dr. H. M. Gardiner, Dr. O. E. Morehouse and Dr. E. N. Reynolds.

Dr. F. L. Whitehead, Secretary of the New Brunswick Medical Society, appeared before the following district Medical Societies, Madawaska, Carleton-Victoria, St. Croix and Washington County and Saint John discussing the following subjects: (1) The present status re Group Practice, Specialism and College of General Practice. (2) The Canadian Sickness Survey. (3) Prepaid Medical Care, Trans-Canada Medical Plan. (4) Specialists in prepaid medicine. (5) National Health Grants—Present status of Health Insurance. (6) The policy of C.M.A. (7) Insurance Companies.

Dr. D. F. V. Brunsdon recently of Guy's Hospital, London, England, has reported for duty on the staff of the Provincial Laboratories at Saint John.

Dr. Fred Jennings of Saint John attended the meeting of Divisional Chairmen of the Public Relations Committee with the Nucleus Committee of the Public Relations of the C.M.A. in Toronto early in February.

This reporter enjoyed the opportunity of meeting and welcoming Dr. Stanley Gilder and his family as they disembarked from the Canadian Pacific *Empress of France* at Saint John in mid-February. A. S. KIRKLAND

NOVA SCOTIA

Dr. Douglas E. Cannell, Professor of Obstetrics and Gynæcology at the University of Toronto, visited Halifax February 2 and 3, and gave a series of lectures and case presentations under the auspices of the Post-Graduate Committee of Dalhousie University. Dr. Cannell's two main addresses were "Research Aspects of Obstetrics" and "Problems of Difficult Labours".

At the annual meeting of the Halifax County Cerebral Palsy Association, Mrs. Frank Wellard was re-elected president. Mrs. Wellard has headed this group since she was the prime mover in its formation 3 years ago. At the present time there is a school for these children sponsored by the City of Halifax, and the Walter Callow busses take them to and from the school. At the present time 115 palsied children have been diagnosed in Nova Scotia but it is estimated that there are nearly 500 in this province. Mrs. Wellard who has been vitally interested in this work since 1948, has been urging other communities throughout Nova Scotia to form themselves into strong local groups so that assistance may be elevated to a provincial level.

Fifteen special clinics held in the Halifax-Dartmouth area during January produced 3,000 pints of blood for the Red Cross Society. The outstanding clinic of the month was the one held at H.M.C.S. *Stadacona*, when almost 900 donations were registered, setting a new record for blood volunteers on a naval establishment in Canada. The armed services in Nova Scotia have been of great assistance in maintaining the Red Cross blood bank.

Dr. R. O. Jones, Professor of Psychiatry at Dalhousie University, was re-elected president of the Nova Scotia Society for Mental Hygiene. Dr. Jones in his annual report referred to the work of the Scientific Advisory Committee which was making a survey of mental health facilities in the province, and cited also the need of increased personnel in a wide variety of mental health services.

The Post-Graduate Committee of Dalhousie University Medical School has announced that four one-year rotating residencies in general practice have been made available for the year starting July 1, 1954. The year will consist of three months' training in each of the following subjects—medicine, obstetrics and gynæcology, pædiatrics and minor surgery.

The annual initiation banquet of the Alpha Eta Chapter of the Phi Rho Sigma Medical Fraternity was held on January 27 in the Lord Nelson Hotel. There were twenty-two new initiates including one honorary member, Dr. J. McD. Corston. Dr. J. W. Reid with his usual spontaneous wit ably filled the toast-master's chair and the guest speaker, Dr. A. W. Ross of Moncton, gave a very interesting address.

During the month of February the medical officers on two visiting foreign warships visited various medical centres in Halifax. Capitao de Corveta (Lt. Cdr.) Celso Ramos and Capitao Tavente (Lt. S. G.) Almyr de Souza of the Brazilian Naval Training Ship *Duque de Caxias* spent 10 days in port. Several weeks earlier the Netherland's Cruiser H.M.N.S. *de Ruyter*, one of the most up to date naval vessels afloat, spent 5 days in Halifax and its two doctors Lt. Cdr. Bakkes and Lt. Cdr. Meiyer, were also extended the courtesies of this port by Surg. Capt. F. W. McHattie Command Medical Officer, and Surg. Cdr. Roberts, Principal Medical Officer, H.M.C.S. *Stadacona*.

C. M. HARLOW

ONTARIO

The L. G. McCabe Award made annually to the author of the best paper presented by a local member of the Essex County Medical Society at any of the hospital staff meetings or at the annual Clinic Day was divided this year between two winners. These were Dr. John Maus who presented "The Story of Nuclear Medicine" and Dr. Irvin Strathman whose paper was "Chronic Cervicitis".

Dr. Jack Kennedy addressed the Essex County Medical Society on Fractures. He advocated treatment of complete shoulder separation by lag screw. He stressed the simplicity and value of Kirschner wires in the clavicle, humerus and forearm. He advised fixation of femoral fractures by Küntscher nailing, and femoral neck fractures by Moe plating rather than by the widely used Smith Petersen nail.

Dr. Hugh Neil Cleland of Toronto has been awarded a $2,100 British Empire Cancer Campaign Exchange Fellowship by the Canadian Cancer Society. Dr. Cleland graduated from University of Toronto in 1947. For the past year he has been resident surgeon at the Wellesley branch of the Toronto General Hospital. He will use his fellowship for a year in general surgery under Sir James Paterson Ross at St. Bartholomew's Hospital, London.

The Ontario Departments of Health and Agriculture are planning a campaign against weeds that cause hay fever, such as June grass, ragweed and golden rod. The Health Department will carry on a course of lectures to organized groups to teach them what the weeds look like, so they can hunt and destroy the offenders. The Agriculture Department will announce what weeds are to be destroyed. All landowners are to watch for them and take steps to eradicate them.

Recent donations and bequests to the University of Toronto for research, scholarships and bursaries have been announced. They are: $10,000 from the estate of Joseph Aziz, the income to be available to a promising medical student who merits financial assistance; $2,500 from Burroughs Wellcome and Company for a fellowship in the field of hypertension investigation, and $2,500 for a research fellowship in anæsthesia and applied pharmacology; an annual prize of the British Encyclopædia of Medical Practice from Butterworth and Company to a final year medical student; $4,000 a year from Parke, Davis and Company for research on deafness; $2,500 a year for five years from C. Gordon Cockshutt for research in cardiovascular diseases; $1,000 from Mrs. W. L. Matthews to establish a fund for the advancement of neurosurgery; and $200 from W. A. Beverly for the advance of psychiatry.

Last year 114 patients were admitted to the IODE Hospital for Convalescent Children, now operating as a Junior Sanatorium in Toronto. At present about 45% of the patients have come from European countries. Dr. Gladys Boyd, in her medical report to the Board, urged more adequate screening of immigrants before admission to Canada.

The Metropolitan Welfare Committee of Toronto has approved plans for construction of a $3,000,000 old people's home at Newmarket. It will accommodate 325 patients requiring special care. The home is expected to be open in September 1955.

Other homes for aged persons who are bedridden are expected to be built in Etobicoke and Scarboro. The walking aged will be accommodated in another home that may be built in North York. The four new homes and Lambert Lodge will care for about 2,000 people.

The Ontario Division of the Red Cross has officially sanctioned the inclusion of work for senior citizens of the province as part of its program. Interest in this group of people began because some 500 shut-ins began knitting and sewing for the Toronto Branch. The program has now increased to embrace practically all phases of Red Cross, even swimming and water safety programs. The first aid committee conducts classes for older people, the work committee distributes sewing and knitting, corps committee drives and entertains, the nursing committee does reading, visiting, shopping and nursing and the welfare committee does hospital visiting. There are 85,000 people over 65 living in Toronto.

Canad. M. A. J.
April 1954, vol. 70

About 200 members from all parts of the province attended the three-day postgraduate course in Cardiovascular Diseases arranged by the Ontario Medical Association at Sunnybrook Hospital in February.

Construction of the Ontario Cancer Research Institute at a cost of $8,500,000 will soon be started. Plans call for the centre to be operating as a research, teaching and treatment centre for Ontario in 1956. Delay in construction of the centre has been occasioned by revisions of basic plans after careful study of institutes all over the world. The new centre will embody every known facility for research and treatment as well as providing a teaching centre for Ontario's medical schools. Ontario plans have been studied by Dr. Ralston Paterson of Manchester, by Dr. David Smithers of the Royal Cancer Hospital, London, by Dr. Jens Neilsen of the famous Copenhagen Clinic and by other leading authorities.

Dr. C. H. Best gave the Nu Sigma Nu annual lecture for 1954 at the Louisiana State University School of Medicine, New Orleans. His subject was "Recent Studies with Insulin and Choline".

The Ontario Division of the Canadian Arthritis and Rheumatism Society last year assisted six out-patient arthritic clinics in Ontario hospitals and maintained thirteen mobile physio-therapy units. New units were installed in Sudbury, London and Toronto. Others operate out of Oshawa, St. Catharines, Leamington, Kingston and Ottawa.

In 1953 there were 2,800 babies born in Women's College Hospital without a maternal death. This is more than 10% of babies born in Toronto. Surgical operations performed in the hospital numbered 3,381 during the year.

LILLIAN A. CHASE

QUEBEC

Our Provincial Committee on Hospital Problems presented on February 26 a memorandum to the Royal Commission on Inquiry on Constitutional Problems. This brief emphasized that the financial situation of Quebec hospitals is getting worse from year to year despite substantial Government grants and increasing revenue from hospitalization plans. As an immediate solution the Committee recommended revision of the Quebec Public Charities' Act—an increase in the Provincial Government contribution from $5.50 to $8.50 per patient-day for class A1 hospitals—and a more adequate assigning of financial responsibilities.

Discussing operation costs, it is asserted that the patient-day cost in Quebec hospitals is at present $12.94. The deficit per patient-day amounted to $1.48 in 1951. It is estimated that in 1951, A1, A2 and A3 hospitals gave $4,000,000 in free service to Q.P.C.A. patients alone. It follows therefore that the province and municipalities pay only 33 to 47% of charity patient-day costs. The hospitals bear the balance.

The higher hospitalization costs are traced mainly to large salaries. In certain institutions salaries and wages make up as much as 68% of the budget. There has been considerable reduction in working hours, and more scientific and costlier techniques have been added. Repairs as well as maintenance and construction costs are higher.

The only permanent solution to this problem, in the opinion of the Committee, is the establishment of a contributory non-government hospitalization insurance plan, compulsory if required. If the population does not take the initiative in establishing its own hospitalization insurance plan, it is likely that a Federal plan will be instituted in a not too distant future. Such a plan, forced upon the Quebec population, would not necessarily be ideal.

This brief was presented to the Commission by Rev. Hector L. Bertrand, chairman of the Comité des Hôpitaux du Québec, and J. H. Roy, president of the Montreal Hospital Council. The former is a grouping of 141 Roman Catholic institutions, while the Montreal Hospital Council represents 32 hospitals in Greater Montreal, one in Quebec City, one in Sherbrooke and one in Ste. Agathe des Monts.

Added emphasis on the plight of our hospitals was indicated when Rev. Bertrand called Rev. Mother Ste. Jeanne de Chantal, of the Hôtel Dieu St. Valier, Quebec City, to give evidence before the Royal Commission. The Reverend mother represents North America's oldest religious order, Les Sœurs Hopitalières de St. Joseph, who have operated Canada's oldest hospital for many centuries without financial aid. Rising costs have been so great that their Order can no longer take care of deficits with its own resources. Therefore the Provincial Government's financial assistance is requested.

Here are a few of the highlights from the Montreal Medico-Chirurgical Society. On February 5, Dr. Henry Michelson, Professor of Dermatology and Syphilology, University of Minnesota, spoke on "Cutaneous Cancer". He covered the field quite thoroughly, from the precancerous lesions through to therapy. Because the tissues are visible, diagnosis is simple but microscopic verification is essential. Treatment depends upon age, location, type and duration. Long follow-up is essential. On February 26, the Section of Tuberculosis and Diseases of the Lungs presented, in connection with the scientific opening of the Royal Edward Laurentian Hospital Surgical and Laboratory Buildings, a full-day scientific program. In addition to a number of excellent presentations by our local colleagues, Dr. Arthur J. Vorwald, Professor of Occupational Medicine, Wayne University, discussed the pneumoconioses and their relationship to chronic pulmonary disease; Dr. William B. Tucker, Professor of Medicine, University of Minnesota, spoke on the present trends in the chemotherapy of tuberculosis; and Dr. John D. Steele, Assistant Clinical Professor of Surgery, Marquette University, gave an excellent presentation on the indications for surgery, particularly resection, after preparation with long-term chemotherapy.

Friends and graduates of McGill University will be interested to know that their Alma Mater fund since 1948 has now reached $738,971. On February 25, Anson C. McKim, the chairman of the fund, presented the principal of the university with a cheque for $160,821, last year's proceeds from the fund. This is an increase of $31,770 over the previous year's contributions. It is pleasant to note that last year the medical graduates formed the largest faculty percentage of givers. A total of $41,863 was contributed by 1,858 doctors, representing half the medical graduates.

The Institute of Microbiology, University of Montreal, headed by Dr. Armand Frappier, was recently granted a $46,220 Federal health grant, for research on blood derivatives. It is planned to establish and operate a pilot plant laboratory for research on blood derivatives. The Institute will prepare fractions from blood and study them by physico-chemical and biological methods. It will make any by-product of such research, such as gamma globulin, available to public health authorities.

Dr. Alton Goldbloom, formerly physician-in-chief at the Montreal Children's Memorial Hospital, has been invited to give the Windermere lecture before the British Pædiatric Association on April 29. Sailing on March 6, he will give a series of lectures at the Hôpital des Enfants Malades in Paris, and speak at the Hebrew University in Jerusalem, the Israeli Medical Society and the Israeli Pædiatric Society. Dr. Goldbloom also plans to teach for a while at the Hadassah Hospital in Jerusalem. He will

deliver the Windermere lecture on his return journey, and also speak to students at the Universities of Sheffield and Manchester, and the Liverpool Pædiatric Society.

A. H. NEUFELD

SASKATCHEWAN

Dr. George Walton, Regina's Medical Officer of Health, recently reported that Regina came through its worst outbreak of polio in 1953. There were 151 cases and 13 deaths.

Considerable attention is being focused on the subject of fluoridation in Saskatchewan at the present time, Regina and Saskatoon have endorsed its introduction despite some objection on the part of various local lay groups.

During May 6, 7, and 8, a postgraduate course is being held in Regina under the auspices of the Regina and District Medical Society and sponsored by the Lederle Laboratories Division, American Cyanamide Company.

On Thursday evening May 6, a dinner will be held at the Hotel Saskatchewan, and on Friday, May 7, an all day session on Acute Infectious Diseases will be held when the following speakers will be heard: Dr. D. Horstmann of Yale will discuss "Anterior Poliomyelitis—Progress in Immunization"; Dr. Gordon Meiklejohn of the University of Colorado will speak on "The Diagnosis and Treatment of Meningitis in Childhood"; Dr. Martin Hoffman of McGill University will talk about "Infectious Hepatitis—Treatment of the Acute Attack"; Dr. Lennox Bell of the University of Manitoba will discuss "The Diagnosis and Treatment of Virus Pneumonia", and "The Use and Abuse of Antibiotics in the Treatment of Acute Infectious Diseases", will be the topic of Dr. K. J. R. Wightmann of the University of Toronto.

There will be a luncheon at noon and an evening reception for the attending Doctors and their wives. On Saturday, May 8, "Grand Rounds" will he held at the Regina General Hospital.

Contract practice in Saskatchewan at times appears to be an undesirable arrangement. In some areas little trouble and disagreement are reported, but in others many physicians at times feel that their arrangements are entirely unsatisfactory.

Recently one physician discussed with the writer by letter, his feelings in this matter. As such, he states that in his opinion "It is completely outdated as a scheme of prepaid medical attendance". Continuing, he indicates that it is his impression that the amount of services being demanded by the people makes it impossible to give the individual patient anything like the time and care necessary for proper diagnosis and treatment.

On one occasion, which led to his resignation, a disgruntled patient and her husband circulated a petition requesting his resignation and canvassed his area for complaints. Subsequently it was shown that their own complaint was completely false and even the dates of the alleged events were incorrect.

As an example of the type of complaint submitted, one patient who complained of the doctor not being available at all times, later admitted that he knew where the doctor was but didn't want to disturb him. Another objected because he couldn't cure a case of scarlet fever in two days.

Our friend feels that such activity, as discussed above, does not give a doctor who is under contract adequate consideration for the work he does for the people he serves. This does not apply to all his patients, most of whom are very fine people, but it still remains "that there is a small minority who are unfortunately very vocal" and "who make it impossible for any self-respecting doctor to enter into a contract to do their medical work."

G. W. PEACOCK

NEWS OF THE MEDICAL SERVICES

Canadian Armed Forces

Several medical officers of the Royal Canadian Navy have recently completed courses in specialties.

Surgeon Commander J. C. Gray, R.C.N., has returned to Canada from an eighteen month course in internal medicine at the Postgraduate School of Medicine, London, England. He has been appointed as internist to the R.C.N. Hospital at H.M.C.S. *Naden*, Victoria, B.C.

Surgeon Lieutenant E. R. Kierstead, R.C.N., and Surgeon Lieutenant N. W. Bradford, R.C.N., are completing an intensive seven weeks' indoctrination course in some aspects of aviation medicine applicable to the Navy and Air Force at the Institute of Aviation Medicine in Toronto, Ontario.

Surgeon Lieutenant C. A. West, R.C.N., has been appointed from R.C.N. Hospital, Victoria, B.C., to Toronto where he will take up duties in the Toronto Military Hospital.

Colonel G. L. M. Smith, C.B.E., C.D., of the staff of the Director General of Medical Services has been awarded the Legion of Merit, Degree of Legionnaire, U.S. Army, in recognition of his service in Korea. Lieut.-Colonel J. D. Galloway has been awarded the O.B.E. for distinguished service in Korea.

Lieut.-Colonel A. L. Kerr is taking a residency in Internal Medicine at Brooke Army Medical Centre, Fort Sam Houston, Texas and Major G. S. Whittingham is taking an assistant residency in Internal Medicine at Deer Lodge Hospital, Winnipeg, Manitoba.

Major F. C. R. Chalke of the staff of the Director General of Medical Services has retired from the Canadian Army and has taken an appointment with Defence Research Board.

Air Commodore A. A. G. Corbet, Director of Medical Services (Air) and Group Captain D. G. M. Nelson, Deputy Director, attended the annual meeting of the Aero Medical Association held in Washington, D.C., March 29-31, 1954.

NEWS AND NOTES

DALHOUSIE AND LAVAL UNIVERSITY GRADUATES AWARDED BRITISH EMPIRE EXCHANGE FELLOWSHIPS

Under an exchange between the National Cancer Institute of Canada and the British Empire Cancer Campaign two more Canadian doctors will study in Europe and two British doctors will come to Canada for study. One of the purposes of the exchange is to keep each country informed on what the other is accomplishing in the cancer field.

The Canadian awards for 1954 went to Dr. Robert Garneau of Quebec City and Dr. J. P. Wallace Thomas, Vancouver.

Dr. Garneau already has considerable cancer research experience. Since graduating in medicine from Laval University in 1949 he has studied at Laval's Institute

Canad. M. A. J.
April 1954, vol. 70

of Pathology and at hospitals in Quebec City. During the past year he has been working at the Cancer Institute in Paris under Professor Charles Oberling. He will use his award to study under Dr. Robb-Smith at Oxford University.

Dr. Thomas graduated from Dalhousie Uuiversity in 1945 and since then he has had considerable postgraduate study in internal medicine, especially diseases of the blood. He has worked at the Department of Clinical Pathology at the Vancouver General Hospital and at the British Columbia Cancer Institute. He will use his award to study leukæmia and allied disorders at the British Post Graduate Medical School, Hammersmith, London, England.

The American Federation of Soroptimist Clubs, Western Canada Region, announces a postgraduate scholarship of $1,500 for a Canadian woman physician: the grant to be made in the summer of 1954.

The object of the grant is to promote special training to a woman whose graduation from a Canadian medical school has been within five years of application.

Applications to be made to Mrs. L. M. Brolin, 34 First Avenue, Chilliwack, B.C.

WORLD HEALTH ORGANIZATION 1955 PROGRAM AND BUDGET

The Executive Board of the World Health Organization, of which Canada nominates a member, met for its 13th session in January in Geneva, Switzerland. Its most important decision was to support the Director-General in recommending a substantial increase in the 1955 budget from $8,500,000 to $10,300,000. It now rests with the World Health Assembly in May to implement or reject this recommendation. The Director General's proposal for an increase in this budget was prompted by a number of considerations including the wide fluctuations in the amount of money available from the UN Technical assistance funds and the consequent difficulty of planning or operating rationally programs financed from this source. Indeed, some important programs involving maternal and child health have been maintained only with the aid of money borrowed from UNICEF to pay the salaries of medical personnel, an unsatisfactory state of affairs which can scarcely be allowed to continue.

As regards program trends, it should be noted that the Executive Board endorsed the view of the Director-General that emphasis should shift somewhat from the control of specific communicable diseases, of which tuberculosis, malaria, and the venereal diseases are the most important examples, to the positive promotion of health, a field which includes such diverse activities as the promotion of mental health, satisfactory nutrition, and the education of the public in matters of health.

OTTAWA UNIVERSITY NEUROPATHOLOGICAL UNIT RECEIVES FEDERAL HEALTH GRANT

Establishment of a neuropathological unit at the University of Ottawa will be supported by a federal grant of $3,575. Funds will be provided under the Mental Health Grant in the National Health Program and will make possible the development of a neuropathological unit in the Ottawa area.

Adequate pathological services are essential to the extension of a suitable mental health program and the establishment of such a unit by the University of Ottawa

(Continued on page 80 of the advertising section)

BOOK REVIEWS

SURGERY OF REPAIR AS APPLIED TO HAND INJURIES

B. K. Rank, Honorary Plastic Surgeon, Royal Melbourne Hospital; and A. R. Wakefield, Honorary Plastic Surgeon, Children's Hospital, Melbourne. 256 pp. illust. $6.75. E. & S. Livingstone Ltd., Edinburgh and London; The Macmillan Co. of Canada Ltd., Toronto 2, 1953.

This book records the experiences of the authors in the treatment of hands injured in industry and in war. It is divided into five parts: general considerations, primary, intermediate, and secondary treatment, and special aspects, *e.g.*, burns, injuries in children, and prostheses. From the opening chapter on the social significance of hand injuries to the final chapter (on prostheses) this well illustrated and compact volume is a mine of practical information. It will be a necessity for those treating hand injuries, and should be on the shelves of all surgeons. As the authors state in the preface, the problem of the injured hand "offers unique stimulus, scope and prize to the art of surgery and to the craft of surgeons". Their reaction to the stimulus deserves high praise. The publishers are to be congratulated on the excellence of the publication.

TUMORS OF THE ORBIT AND ALLIED PSEUDO TUMORS

R. G. Ingalls, formerly Instructor in Ophthalmology, College of Physicians and Surgeons, Columbia University; formerly, Assistant Ophthalmologist, Presbyterian Hospital and Vanderbilt Clinic. 410 pp. illust., $12.75. Charles C. Thomas, Springfield, Ill.; The Ryerson Press, Toronto, 1953.

In this book Dr. Ingalls has produced a monograph rather than a comprehensive discussion of tumours of the orbit. He analyses 216 case histories of tumours of the orbit and allied pseudo-tumours found for the most part in the clinics of the Institute of Ophthalmology of the Presbyterian Hospital in New York City, and to a lesser extent in the Head and Neck Clinic of the Memorial Hospital for Treatment of Cancer and Allied Diseases. In an introductory chapter he presents a résumé of the tumours to be found in the orbit and presents tables showing the frequency, sex distribution, age distribution and such matters of each tumour found. He then presents in each of the following chapters a full discussion of one tumour type, with illustrative detailed case reports on patients studied in his clinics. The illustrations are numerous, well chosen, and beautifully reproduced. The result is a most instructive volume. However, it is one more for the connoisseur than for the average student.

THE NORMAL CHILD

R. S. Illingworth, Professor of Child Health, The University of Sheffield; Pædiatrician to the Children's Hospital Unit and the Jessop Hospital for Women, The United Sheffield Hospitals. 342 pp. illust. $6.00. J. & A. Churchill Ltd., London; British Book Service (Canada) Ltd., Toronto, 1953.

This book very ably covers the whole field of the normal, healthy infant and small child; together with the medical facts is included a great deal of common sense. The first section deals with feeding problems in both the breast fed and artificially fed infants and is a very com-

plete discussion of these problems. The second section deals with physical problems such as the assessment of physical development including a discussion of the Wetzel Grid, head circumference and chest circumference. The third section deals with developmental problems and contains a very excellent pictorial description of the development of the standing position, sitting position and hand manipulation and a comprehensive table showing development at various ages from 4 weeks to 3 years. The fourth and final section discusses the behaviour problems seen in the well infant and small child.

While the information in this book is well known to the practising pædiatrician, the book would be of considerable aid to the general practitioner who includes well baby care in his practice and to the nurse or medical student.

AMEBIASIS

H. H. Anderson, Professor and Chairman, Pharmacology and Experimental Therapeutics, The School of Medicine, University of California Medical Centre, San Francisco, California; W. L. Bostick, Associate Professor of Pathology, Department of Pathology, The School of Medicine, University of California Medical Centre, San Francisco, California; H. G. Johnstone, Professor of Parasitology, Parasitology and Mycology Section of the Department of Medicine, University of California Medical Centre, San Francisco, California. 431 pp. illust. $12.75. Charles C. Thomas, Springfield, Ill.; The Ryerson Press, Toronto, 1953.

This large monograph is entirely devoted to the consideration of a disease which has been somewhat neglected in the United States and Canada. It contains a large body of information covering all aspects of the disease and its causative agent. The authors emphasize the prevalence of the condition, even in temperate climates, and stress the fact that the disease is all too seldom searched for. The literature has been thoroughly combed and the opinions of the authors are well documented. There is a fairly large number of errors in the text. At times the presentation becomes diffuse and there is a good deal of redundancy. The chapter on therapy is a little confusing particularly in relation to the current status of emetine.

On the whole this is a useful and extensive report on a rather neglected disease.

ATLAS OF MEDICAL MYCOLOGY

E. S. Moss, Director, Department of Pathology, Charity Hospital of Louisiana at New Orleans; Clinical Professor of Pathology, Louisiana State University School of Medicine; and A. L. McQuown, Pathologist, Our Lady of the Lake Sanitarium, Baton Rouge, Louisiana. 245 pp. illust. $9.00. Williams & Wilkins Co., Baltimore; Burns & MacEachern, Toronto, 1953.

This well-printed atlas contains not only pictures as might be expected; the accompanying texts deal with clinical pictures, x-ray diagnosis, laboratory diagnosis, mycology, histology, treatment and prognosis of practically all mycoses. As well as covering these more medical and mycological aspects of the subject, this book also includes chapters on the taxonomy of fungi, on methods, immunology, and contaminants, and offers a glossary of technical terms and a formulary.

The clinical pictures given are very good, but, unfortunately, the same can not be said of many of the numerous micrographs, especially those of infected hairs in Figs. 166 and 167, which are incomplete and poor. In this respect, as in some others, the chapters on systemic infections are better dealt with than that on dermatomycoses. Surprisingly, however, the atlas does not demonstrate any of the cultural appearances of the tissue-like phase of the fungi causing deep infections.

In the atlas all cultures of fungi are described as grown on Sabouraud glucose agar, and Littman oxgall medium. There is no doubt that the latter has its merits for the purification of cultures, and in special cases, for the isolation of pathogenic fungi. However, the Littman medium has a strong morphogenetic effect on the organisms, and therefore, cultures grown on this medium are very difficult to recognize, especially for people with insufficient experience. Furthermore, it delays the appearance of primary cultures from infected material; and in moniliasis, the number of cultures obtained on this medium is smaller than on Sabouraud's which gives a wrong impression of the quantity of yeasts present in the specimen. The question may be raised, therefore, whether the authors have not overemphasized the use of this medium in medical mycology.

In a future edition the mycological features should be more heavily stressed and the taxonomy of the Candida species brought up to date. It would be gratifying to see these corrections and perhaps a slightly wider selection of micrographs, which would make this book a useful atlas of medical mycology.

ATLAS OF TUMOR PATHOLOGY

Reference is made to five volumes; namely, Tumors of the Thyroid Gland by S. Warren and W. A. Meissner, 97 pp. illust. $1.75; Tumors of the Parathyroid Glands by B. Castleman, 74 pp. illust. $0.65; Tumors of the Lower Respiratory Tract by A. A. Liebow, 189 pp. illust. $1.25; Tumors of the Male Sex Organs by F. J. Dixon and R. A. Moore, 179 pp. illust. $1.50; and Tumors of the Central Nervous System by J. W. Kernohan and G. P. Sayre, 129 pp. illust. $0.90. Published by the Armed Forces Institute of Pathology, Washington, D.C., 1953.

The authors of each of these atlases, having had wide and varied experience in their respective fields, have produced well-illustrated and documented atlases designed primarily for the pathologist and the specialist in their respective fields. The numerous photographs illustrating gross and particularly the microscopic pathology are well chosen. The authors have made excellent use of their experience and that of others interested in their respective fields. This makes these atlases the most authoritative and up-to-date reviews seen by your reviewer.

PEPTIC ULCER

L. A. Smith, Assistant Professor of Medicine, Mayo Foundation; and A. B. Rivers, Late Associate Professor of Medicine, Mayo Foundation. 576 pp. illust. Appleton-Century-Crofts, Inc., New York, 1953.

This book deals with the practical aspects of the diagnosis and management of patients with peptic ulcer. The authors have emphasized the significance of variations in the symptomatology and especially of the pain patterns as a result of complications of this condition. The site and histopathogenesis of the lesions are determined from a careful analysis of signs and symptoms. The treatment of peptic ulcer is well presented and reflects the authors' wide experience and sound judgment. It should be noted, however, that the views expressed regarding the high incidence of malignancy in apparently benign gastric ulcers are not accepted by all authorities. The discussion of massive hæmorrhage is in some respects inadequate. The relative importance of peptic ulcer as a cause of hæmatemesis varies in different centres. In certain cases prompt endoscopic and radiological examination may be of distinct value in determining the

Canad. M. A. J.
April 1954, vol. 70

nature of the lesion and in directing the immediate management. These criticisms are of rather minor importance in a work of this nature and the book is highly recommended to all physicians and surgeons concerned with the problem of peptic ulcer.

STRESS AND DISEASE

H. G. Wolff, Professor of Medicine (Neurology), Cornell University Medical College; Attending Physician, New York Hospital, New York, N.Y. 199 pp. illust. $5.50. Charles C. Thomas, Springfield, Illinois; The Ryerson Press, Toronto, 1953.

This interesting and stimulating monograph is devoted to a development of the idea that disease is the outcome of attempts at homeostasis in which adaptive responses to noxious forces, whether physical or emotional, are inappropriate both in respect to kind and amount. The author assumes that there is a degree of predictability of reaction including protective patterns and illness for given individual types in specific circumstances, and that a conspicuous portion of man's illnesses is a function of his goals, his methods of attainment and the conflicts they engender. Great use has been made of the author's experimental material which has been gleaned under conditions designed to allow the measurement of bodily functions during exposure to traumatic experiences. The author presents a very convincing argument, even although in some details his conclusions may seem more sweeping than the data justifies. All who deal with patients will find interest in this little book.

MEDICAL HISTORY OF THE SECOND WORLD WAR

Emergency Medical Services. Edited by Lieut. Colonel C. L. Dunn. Volume II, 492 pp. illust. 50s. Her Majesty's Stationery Office, London, 1953.

This volume, part of the fascinating history of the Emergency Medical Services, records some of the achievements and also the mistakes learned in the second world war.

The first part of this book details the E.M.S. in Scotland and Northern Ireland. The larger part of this volume deals with the air-raids on industrial centres, including London. This will be particularly instructive to readers with no personal experience of civil defence in action. E.M.S. function is shown during periods of heavy attacks as well as in slack periods. Examples are given of every aspect of E.M.S. activity. These demonstrate that hospital casualty services, though important, are perhaps the easier part of civil defence. Liaison between hospital service and other parts of the civil defence organization was not always fully effective. Emphasis is placed on the paramount importance of such an efficient liaison. The great value of this book is that it places on record World War II experiences. The medical reader will readily see how the E.M.S. paved the way to much of the present National Health Service.

NEUROPHYSIOLOGICAL BASIS OF MIND

J. C. Eccles, Professor of Physiology, the Australian National University, Canberra. 314 pp. illust. $4.50. Oxford University Press, London, Toronto 2, 1953.

This small volume, with its intriguing title, is based on lectures given at Magdalen College, Oxford in 1952 by one of Sir Charles Sherrington's most distinguished pupils. J. C. Eccles is now Professor of Physiology at the Australian National University, Canberra, and has made many important contributions to the fundamental knowledge of nervous processes. As he states in his preface, these lectures cover "the whole field of Neurophysiology—the reactions of the single nerve or muscle fibre and reactions of the single neurone, the reactions of the simpler synaptic levels of the nervous system, the plastic reactions of the nervous system and the phenomena of learning, the reactions of the cerebral cortex, and finally the relationship of the brain to the mind". This is an ambitious task indeed. The lectures are obviously prepared for an audience of physiologists, and more particularly, neurophysiologists, and are detailed and technical in character. Most, if not all of the basic problems of neurophysiology are discussed with a wealth of detail and reference, and an amazing readiness to construct new hypotheses.

One will find here a full discussion of the author's current thinking on electrical and chemical theories of synaptic transmission. He also expands his well-known theory of learning and memory based on the demonstration of prolonged plastic changes at synapses. Professor Eccles has mentioned elsewhere how he was attracted to the study of the nervous system through a youthful interest in the mind-brain problem, and he devotes his final lecture to this topic. However, the philosophical reader who turns to Chapter 8 will be disappointed if he expects an answer or even a clear restatement of this age-old problem. The author gets involved in a confused dualistic discussion of mind-brain relationships, and even puts forward an "hypothesis of the mode of operation of 'will' on the cerebral cortex". One concludes by wishing that he had kept strictly to neurophysiology, and omitted his final chapter!

This book is a splendid summary of much basic research work in modern neurophysiology and should be in every medical library, but it is clearly intended for workers in this specialized field.

BACTERIAL AND MYCOTIC INFECTIONS OF MAN

Edited by R. J. Dubos, The Rockefeller Institute for Medical Research. 886 pp. illust. 2nd ed. $7.50. J. B. Lippincott Company, Philadelphia, London, Montreal, 1952.

This excellent volume under the able editorship of R. J. Dubos, represents a reiteration of the basic principles of bacteriology from the pens of a panel of the continent's leading experts. Through these leaders the student and the profession at large may read and keep abreast of the newer concepts of both bacteriology and mycology. There are but two chapters in the volume devoted to mycology, but Dr. Conent in this compressed space gives the reader a desire to explore further this expanding branch of science and to apply it in the diagnostic fields of medicine.

This work will be a valuable addition to one's medical workshelf.

MODERN TRENDS IN UROLOGY

Edited by E. W. Riches, President, British Association of Urological Surgeons (Home and Overseas); Surgeon and Urologist, The Middlesex Hospital, London. 476 pp. illust., $15.00. Butterworth & Co. (Canada) Ltd., Toronto, 1953.

In the foreword to this volume it is pointed out by Lord Webb-Johnson that it is not intended to be a comprehensive textbook. Rather, it deals with recent advances in urology, giving the latest teaching and views. It expresses the opinions of 36 different authors covering the different sections of urology from the pathological, medical, physiological, and surgical aspects. Different opinions on debatable points, such as methods of prostatectomy, are expressed in an unbiased manner. It is quite evident that the different sections were written and subsequently revised immediately before publication, as this book is one of the few that has passed from editor to the reader while still "modern". The book is recommended as a valuable contribution to urological literature.

how many clinical problems do you see in this patient?

You see that she is somewhat exophthalmic. You see also that she is overweight. Perhaps less apparent is an even more common clinical problem: mental and emotional distress. Yet this distress either causes or complicates virtually every case you handle. You will find 'Dexamyl' of unique value in managing the mental and emotional distress you see in your practice. 'Dexamyl' is a balanced combination of *two* mood-ameliorating components:

1. 'Dexedrine' Sulfate — the antidepressant of choice—to lift the patient's mood and provide a sense of well-being.

2. Amobarbital (Lilly)—the sedative that elevates mood—to relieve nervousness, anxiety, and inner tension.

Dexamyl's two mood-ameliorating components work synergistically to provide a "normalizing" effect—free of the dulling effect of barbiturates; free of the excitation caused by stimulants.

DEXAMYL *tablets and elixir*

'Dexamyl' and 'Dexedrine' T.M. Reg. Can. Pat. Off.

Smith Kline & French, Montreal 9

Canad. M. A. J.
April 1954, vol. 70

NEW WORLDS AND OLD

C. Singer. 178 pp. $3.25. William Heinemann Medical Books Ltd., London; British Book Service (Canada) Ltd., Toronto, 1951.

No one in our time has done more to explain science to itself and to the world than Professor Singer, formerly Professor of the History of Medicine at Oxford, and now approaching his eightieth year. As medicine and science are becoming more conscious of their role in the world, it must be a source of deep satisfaction to Professor Singer to see that his life-long insistence on historical investigation in the biological sciences is being realized at its true worth. He has been one who has provided us with works of high authority to which men can now turn in their attempt to re-orient knowledge and to integrate science and the humanities.

The papers in this little volume, thirteen in number, are written in Singer's easy style, the result of a complete command of his subject, and with the clarity of a writer who like Bertrand Russell is a master of exposition. They are a model for every one writing scientific English. The most interesting group of essays comprise Singer's views on religion and science in which he adds an informed and balanced opinion to the great debate which continues with increasing vigour in every field of thought. There is a most impressive and compact survey of Greek and Roman medicine, an engaging estimate of Galen in the light of modern medicine, and an appreciation of a forgotten Scots physician, Francis Adams of Banchory who died in 1861 and who combined in a unique way scholarship with country medical practice.

Charles Singer is one of the few great medical humanists of our time. These essays illustrate his claim to that title and illuminate the dominions of medicine and of science.

THE GOLD-HEADED CANE

W. MacMichael. 186 pp. illust., 6th ed. $7.25. Charles C. Thomas, Springfield, Ill.; The Ryerson Press, Toronto, 1953.

The publication of this volume by the House of Thomas which has already placed the medical profession so deeply in its debt is an occasion for rejoicing with a full flourish of trumpets or of stethoscopes and scalpels or for whatever ritual that best expresses an event of professional significance. MacMichael's medical classic first published in 1827 once more makes its bow—its seventh appearance—to a generation of students and physicians fighting a battle in the hazards of the modern world against the imminent ruin of their vascular and nervous systems, and grievously in need of being recalled to the example of the spacious days when medicine was one of the learned professions and directed itself to culture of the mind. The happy collaboration of the publisher who has provided a magnificent format, of Dr. Kerr, the medical humanist who has related the Cane in inspired fashion to the practices of his medical school and of Dr. Waring who has provided a noble blessing, has provided us with a volume that should uplift the spirit of every medical man and give him a good conceit of himself and of his profession.

The Gold-Headed Cane is much more than a superb history of the medical life of the eighteenth century and a fascinating portrait gallery of Radcliffe, Mead, Askew, the Pitcairns, Baillie and their bewigged contemporaries. It is a magic distillation of the spirit of medicine, containing the humour, the earthiness, the drama and the romance of one of the high callings of mankind. It is a book that everyone in the medical world should at least browse through once a year for the good of his soul no less than for the benefit of the souls and bodies of his patients.

The present text has been based on Peachey's fifth edition which in turn followed closely the original author's second edition and has retained Peachey's fine illuminating introduction. On every count this is a triumph of medical book-making and all concerned in its production have earned our congratulations and thanks. And as for the Cane itself honorably reposing in the Museum of the Royal College of Physicians in old London and once more at peace after being disturbed by Hitler's bombs—it will assuredly take on a deeper golden glow of pride.

DISEASES OF THE HEART AND CIRCULATION

P. Wood, Director, Institute of Cardiology, London; Physician, National Heart Hospital. 589 pp. illust., 3rd impression. $14.00. Eyre & Spottiswoode, London W.C. 2; McClelland & Stewart Ltd., Toronto 13, 1953.

This book has been written for graduates primarily interested in clinical cardiology with particular emphasis on maintaining a proper balance between bedside medicine and special tests, between the practical and the academic. To a large degree the author has succeeded in these ambitions. The clinical approach is excellent. The reader is clearly shown the fine points in physical diagnosis of the different types of disease. The exposition on congenital heart disease is very well presented and in a short space covers the subject well. The main criticism I would level at this book is inadequate discussion of mechanisms in the physiology of cardiac conditions. For instance in discussing mechanisms of congestive failure, the theory put forward by Stead and his group is not even mentioned. Therapy, at least as to its mode of action, is also somewhat inadequate. For instance, the actions of

lung infection?

ESTOPEN injection

Trade mark

• the penicillin that reaches the lung *in strength* • vials of 100,000, 500,000 and 2,500,000 units
• Separate pack of "water for injection" available

GLAXO (CANADA) LTD., 26, DUNCAN STREET, TORONTO, ONTARIO

CONNAUGHT

IN PERNICIOUS ANAEMIA

LIVER EXTRACT INJECTABLE

Liver Extract Injectable provides a thoroughly dependable form of treatment. The preparation of highly purified extracts of liver has been a subject of research studies in laboratories and clinics of the University of Toronto for more than 20 years.

An objective of these studies has been to retain in the extract the anti-anaemia factors of beef liver and to eliminate therefrom other material which might be reaction-producing and which is not necessary for remission of the disease.

The success of the studies is evidenced by the fact that a dose of Liver Extract Injectable "Connaught", suitable for intramuscular administration once in each three-week period, contains less than seventy milligrams of organic solid.

Liver Extract Injectable, 20 micrograms of Vitamin B_{12} per cc., derived solely from beef liver and tested clinically and by biological assay, is available from the Laboratories in 5-cc. and 10-cc. vials.

CONNAUGHT MEDICAL RESEARCH LABORATORIES
University of Toronto **Toronto, Canada**

Established in 1914 for Public Service through Medical Research and the development of Products for Prevention or Treatment of Disease.

Canad. M. A. J.
April 1954, vol. 70

digitalis are dismissed in a few lines and there is no description at all of how the mercurial diuretics act. A very practical question, the evaluation of cardiac patients undergoing major surgery, is not even mentioned. However in spite of a few shortcomings this is a very readable and useful book. The illustrations are numerous and of high quality. It is a definite contribution to modern cardiology.

DERMATOLOGY—ESSENTIALS OF DIAGNOSIS AND TREATMENT

M. B. Sulzberger, Professor and Chairman, Department of Dermatology and Syphilology, New York University Post-Graduate Medical School; and J. Wolf, Associate Professor of Clinical Dermatology and Syphilology, New York University Post-Graduate Medical School. 592 pp. illust. $10.00. Revised Edition. The Year Book Publishers Inc., Chicago; Burns & MacEachern, Toronto, 1952.

This volume is a veritable gold mine of dermatological information for the specialist and for practitioners who have the dermatoses under their care. Doctors Sulzberger and Wolf have separated the dross from the gold and have given in a concise, clear style the diagnostic points coupled with the indicated therapeutic regimes covering practically all of the conditions met with in cutaneous medicine. The authors speak with authority and give the points for and against the newer remedies which they have evaluated after extensive clinical trial. Larger works contain a greater amount of data, but this book, although condensed, does not suffer from a telegraphic style of writing.

Dermatological Diagnosis and Therapy bids fair to become The Dermatologist's Bible.

QUEBEC DIVISION

Canadian Medical Association

ANNUAL MEETING

Friday and Saturday, May 7-8, 1954

Three Rivers, Quebec

HANDBOOK OF DIET THERAPY

Written and compiled by Dr. Turner. Revised Edition. 138 pp. $3.50. The University of Chicago, Illinois, 1952.

This small book should be most useful to physicians. Unlike most books on diet, it does not deal with diseases and their treatment except in the case of diabetes, but begins by describing normal dietary requirements and then elaborates on its various modifications. It first defines briefly but clearly what are the basic requirements. The physical variations are disposed of first, and then caloric changes. The diabetic diets with the various food exchange lists is the method followed. This is the diet that is being used so extensively now, and is the one recommended by the committee of the American Dietetic Association in conjunction with the American Diabetic Association, and the Food and Nutrition Board of the National Research Council. The tables in the book, and in the appendix, are extensive, thorough and simple, and have been brought thoroughly up to date. This book is highly recommended for anyone having to do with diets.

SYPHILITIC OPTIC ATROPHY

W. L. Bruetsch, Clinical Professor of Neurology and Psychiatry, Indiana University School of Medicine, Clinical Director and Head of the Research Department, Central State Hospital, Indianapolis, Indiana. 138 pp. illust. $5.50. Charles C. Thomas, Springfield, Illinois; The Ryerson Press, Toronto, 1953.

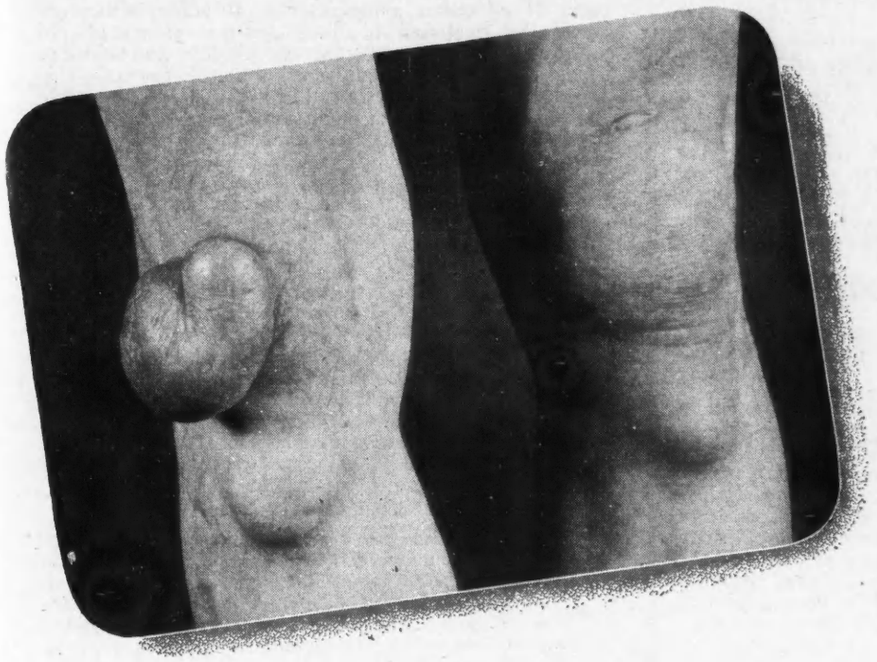
This excellent monograph contains the latest information on the pathogenesis, diagnosis and treatment of syphilitic optic atrophy. The prefix "primary" which presupposes a purely degenerative lesion has been dropped, as there is always a preliminary chronic inflammatory process, followed by a degeneration. Of all cases of optic atrophy 19.3% are due to syphilis, 18% due to multiple sclerosis and 15.3% to intracranial tumours. Pathogenesis is well discussed with case reports to emphasize that the degeneration of the optic nerves is secondary to an inflammatory reaction. The beginning of syphilitic optic atrophy takes place, mostly, in the intracranial portion of the optic nerves or in the chiasma. From here the inflammatory demyelinating process causes an atrophy which proceeds in both directions.

Insidious onset of optic atrophy makes it essential to check every syphilitic patient for pupillary abnormalities, fundus changes and visual field changes. Optic atrophy is well advanced when subjective symptoms appear. Malaria therapy was the turning point in the successful treatment of syphilitic optic atrophy. Now penicillin therapy is thought to be as effective, if not more so than the somewhat dangerous malaria therapy. The abandonment of malaria or combined malaria-penicillin therapy for treatment of syphilitic optic atrophy in favour of penicillin therapy alone is being considered.

INFECTIOUS MONONUCLEOSIS

S. Leibowitz, Associate Physician, Beth Israel Hospital, New York. 163 pp. $5.75. Grune & Stratton, New York; The Ryerson Press, Toronto, 1953.

It is disappointing to see the publication of a monograph which makes so little contribution to the clinical or hæmatological knowledge of the disease dealt with. Dr. Leibowitz describes his observations on 25 cases of infectious mononucleosis which is indeed a meagre experience with this relatively common condition. Ten pages are devoted to a discussion of involvement of the heart and of the central nervous system by infectious mononucleosis although the author's series does not include an instance of either, while the astonishing statement is made that "despite the absence of clinical signs and symptoms referable to the heart it is probably advisable to perform electrocardiograms routinely in all

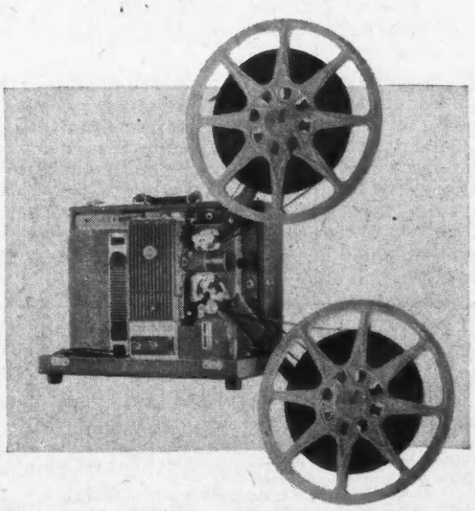


Xanthoma. Subject lighted to show protuberant character of tumor.

To present your findings brilliantly

...with great new flexibility

If yours is a project or a subject where continuity is vital—surgery for example; if you have showings to be made before large as well as small audiences, sometimes by yourself, sometimes by others—you'll require 16mm.



film and a competent, high-quality projector.

Everything you want—with a Kodascope Pageant Sound Projector, 16mm. It projects sound or silent film, takes reels up to 2000 feet. It is compact, light—15¾ x 13 x 10¼ inches—weighs only 32½ pounds; is easy to set up and operate; provides brilliant projection even in a large hall—a 2-inch, *f*/1.6 lens, for example, produces a 6-foot-wide screen image at 32 feet.

Sound is wide-range, undistorted, making speech crisp and intelligible. Connection for plugging in accessory microphone permits narration.

"Lubricated for life" bearings need no oiling. Runs cool and quiet. Price, $526, subject to change without notice.

For further information see your photographic dealer or write direct.

CANADIAN KODAK CO., LIMITED
Toronto 9, Ontario

Serving medical progress through Photography and Radiography

Kodak
TRADE-MARK

Canad. M. A. J.
April 1954, vol. 70

BUTTERWORTH & CO. (CANADA) LTD.

Three of the leading British books on the Ear, Nose and Throat

METHODS OF EXAMINATION IN EAR, NOSE *and* THROAT

By W. G. Scott-Brown, C.V.O., M.D., B.Ch., F.R.C.S., Ear, Nose and Throat Surgeon, Royal Free Hospital, London. A practical up-to-date guide to the most efficient way of examining a patient's nose, throat and ear by one of the leading specialists on the subject in Great Britain. General practitioners, pædiatricians and those engaged in postgraduate work, will welcome this new book with its minute instructions in the methods of physical examination of this difficult region. Particular attention is paid to the complications involved in examining such areas as the larynx and the problems which may arise.

100 pages, 94 illustrations. $3.75 delivered.

MODERN TRENDS IN EAR, NOSE AND THROAT

Edited by Maxwell Ellis, M.D., M.S., F.R.C.S., Surgeon to the Royal National Throat, Nose and Ear Hospital, London, Ear, Nose and Throat Surgeon to the Central Middlesex Hospital, London. Important and advancing subjects in the realm of ear, nose and throat work are presented in this new work. Not only is recent progress in the more obscure conditions fully covered, but the book also deals with the most modern views on simple conditions, such as nasal catarrh, nasal infections and sinusitis. Advances in hearing aids and hearing tests are described, and there are sections on the somewhat neglected subject of physiotherapy in ear, nose and throat conditions and on the importance of upper respiratory tract infections in children. Surgical conditions are discussed where surgical technique has undergone significant modifications during the past few years, as in cancer of the larynx and cancer of the pharynx.

355 pages, 50 illustrations. $13 delivered.

DISEASES OF THE EAR, NOSE AND THROAT

Edited by W. G. Scott-Brown, C.V.O., M.D., B.Ch., F.R.C.S. Ear, Nose and Throat Surgeon, Royal Free Hospital, London.

"In two magnificent volumes, Dr. W. G. Scott-Brown has set a splendid standard by this new and complete work . . . a thorough and authoritative survey of all the recent advances, and a symposium which has the unusual advantage of being well-balanced." The Medical Officer.

". . . . will hold its leading place for many years. It will serve as a reference work for experts and should be in the hands of those reading for the higher examinations."
British Medical Journal.

In 2 volumes. Vol. 1. 756 pages, 338 illustrations, 19 colour plates. Vol. 2. 639 pages, 260 illustrations, 8 colour plates. $33.50 delivered.

Ask for a copy to be sent on approval

BUTTERWORTH & Co. (CANADA) LTD.
1367 Danforth Ave., Toronto, Ont.

cases of infectious mononucleosis. If abnormalities are found the treatment of the individual patient should include extended restriction of activity and tracings should be taken repeatedly until abnormalities have disappeared or a stationary record is obtained." Considerable attention is devoted to a discussion of the hepatitis which is associated with infectious mononucleosis. The author's cases were not subjected to liver biopsy which might have contributed to the knowledge of the condition.

No studies as to the cause of the disease were undertaken. Most readers will not be impressed by what Dr. Leibowitz refers to as three clinical "clues" to the etiological factors in the disease. Some discussion revolves around the atypical lymphocyte but the monograph does not contain a description of the cell nor is there any illustrative material. The observations on eosinophilia were not supported by total eosinophil counts. The series is too small to form a basis for judging the effects of antibiotics and other therapy.

This monograph represents a partial review of the literature on infectious mononucleosis. Its value would appear to depend entirely on this fact.

THE PRINCIPLES OF NEUROLOGICAL SURGERY

L. Davis, Professor of Surgery and Chairman of the Division of Surgery, Northwestern University Medical School, Chicago, Illinois. 544 pp. illust. 4th ed. $9.35. Lea & Febiger, Philadelphia; The Macmillan Company of Canada, Toronto, 1953.

The fourth edition of this excellent general text on neurosurgery has been extensively revised. Additions to the text have brought the book thoroughly up to date. The most valuable portions are still the author's experienced and sage general advice about the standard problems, like brain and spinal cord tumours, or trigeminal neuralgia. His special interest, *e.g.*, peripheral nerve injuries, receive disproportionate attention. On the whole a fair balance is maintained, and a surprising amount of clearly stated information covering every field of neurosurgery can be found. The book is well indexed and there are plenty of references. It is highly recommended for the medical libraries of small hospitals, for general practitioners, and for medical students.

PRACTICAL BLOOD GROUPING METHODS

R. L. Wall, Department of Research Medicine, The Ohio State University Hospital, Columbus, Ohio. 175 pp. $6.00. Charles C. Thomas, Springfield, Illinois; The Ryerson Press, Toronto, 1952.

This small book presents in a rather superficial way methods utilized for blood grouping. The author's handling of some of the subjects is far from authoritative. The description of the antiglobulin test is not too well done, nor is the discussion of the Rh nomenclature sufficiently adequate. There is a very brief chapter on recent advances. The book has very few tables and no figures. On the whole the subject is covered in no more detail than that found in some of the better texts on clinical pathology.

SEX MANUAL

FOR THOSE MARRIED OR ABOUT TO BE

Seventh Edition, Revised. A medical best seller. Fifteen printings, 575 000 copies.
By G. Lombard Kelly, B.A., B.S. Med., M.D.
Ethically distributed. *Sold only to physicians, medical students, nurses, pharmacies, medical bookstores or on physician's prescription. This policy strictly adhered to.*
Some of the 25 chapters cover sexual lubricants, use of condom, first intercourse, frequency, positions, clitoris contact, orgasm delay by local anesthesia, impotence, climacteric, birth control, etc.
Catholic Edition, omitting birth control information, same price scale. Mixed orders, same price scale.
Paper cover, 92 pp. (35,000 words), 12 cuts. Single copies, $1.00; 2 to 9 copies, 75c ea.; 10 to 24 copies, 70c ea.; 25 to 49 copies, 60c ea.; 50 to 99 copies, 50c ea.; 100 or more, 45c ea. Postage free by book rate parcel post. Optional: for first class add 15c per copy; for air mail 30c per copy, in Canada, U.S. and Mexico.
Terms: REMITTANCE WITH ORDER; NO COD's. Descriptive folder on request.

SOUTHERN MEDICAL SUPPLY CO.
P.O. Box C-1168 Augusta, Ga.

Books Received

Books are acknowledged as received, but in some cases reviews will also be made in later issues.

Abstracts on Military and Aviation Ophthalmology and Visual Sciences. C. Berens, Professor of Clinical Ophthalmology, New York University; Executive Ophthalmic Surgeon, Pathologist and Director of Research, New York Eye & Ear Infirmary; Consultant in Ophthalmology to the Surgeon General, United States Air Force; and L. B. Sheppard, Assistant Professor of Ophthalmology, Medical College of Virginia; Consultant in Ophthalmology, Veterans Administration Hospital. Vol. I, 539 pp.; Vol. II, 425 pp., $20.00 per volume. Volume III in preparation. Subsequent Volumes will be published bi-annually. The Biological Sciences Foundation, Ltd., Washington 7, D.C., 1953.

Aportacion de Laescuela Espanola a La Tecnica Endobronquial. S. Garcia-Vincente. 43 pp. Dr. S. Garcia-Vincente, Paséo de la Castellana, 78, Madrid (Espana), 1953.

Electrical Methods of Blood-Pressure Recording. F. W. Boble, National Heart Institute, National Institutes of Health, Public Health Service, Federal Security Agency, Bethesda, Maryland. 56 pp. Illust. $3.25. Charles C. Thomas, Springfield, Ill.; The Ryerson Press, Toronto, 1953.

Regional Block. D. C. Moore, Director, Department of Anæsthesiology, Mason Clinic, Chief of Anæsthesia, Virginia Mason Hospital, Seattle, Washington. 373 pp. Illust. $12.00. Charles C. Thomas, Springfield, Ill.; The Ryerson Press, Toronto, 1953.

Clinical Roentgenology. Volume I. Developmental and Systemic Conditions and Local Lesions in the Extremities. A. A. de Lorimier, Radiologist, Saint Francis Memorial Hospital, San Francisco, California; H. G. Moehring, Radiologist, Duluth Clinic, Duluth, Minnesota. Formerly, Director, The Army School of Roentgenology; and J. R. Hannan, Radiologist, Cleveland, Ohio, Radiologist, Lake County Memorial Hospital, Painesville, Ohio. 480 pp. Illust. $20.50. Charles C. Thomas, Springfield, Ill.; The Ryerson Press, Toronto, 1954.

Lesions of the Lumbar Intervertebral Disc. R. G. Spurling, Clinical Professor of Surgery (Neurosurgery), University of Louisville School of Medicine, Louisville, Kentucky. 148 pp. Illust. $5.25. Charles C. Thomas, Springfield, Ill.; The Ryerson Press, Toronto, 1953.

Salmonellæ and Shigellæ. A. J. Weil, Department of Bacteriology, The Bronx Hospital, New York; and I. Saphra, Department of Bacteriology, The Beth Israel Hospital, New York, N.Y. 247 pp. $8.50. Charles C. Thomas, Springfield, Ill.; The Ryerson Press, Toronto, 1953.

Diagnosis and Localization of Brain Tumors. G. E. Moore, Markle Scholar in Medical Science, Director, Roswell Park Memorial Institute, Associate Professor, Department of Surgery, Buffalo University School of Medicine, Buffalo, N.Y. 217 pp. Illust. $11.50. Charles C. Thomas, Springfield, Ill.; The Ryerson Press, Toronto, 1953.

Pregnancy Wastage. Edited by E. T. Engle. 266 pp. Illust. $9.25. Charles C. Thomas, Springfield, Ill.; The Ryerson Press, Toronto, 1953.

Physiological Cardiology. A. Ruskin, Associate Professor of Internal Medicine, University of Texas, Medical Branch, Galveston, Texas. 370 pp. Illust. $8.75. Charles C. Thomas, Springfield, Ill.; The Ryerson Press, Toronto, 1953.

Physiological Methods in Clinical Practice. W. S. Middleton, Department of Medicine, University of Wisconsin Medical School, Madison, Wisconsin. 40 pp. $1.25. Charles C. Thomas, Springfield, Ill.; The Ryerson Press, Toronto, 1954.

The Size and Growth of Tissue Cells. J. G. Hoffman, Director of Cancer Research, Roswell Park Memorial Institute, Research Professor of Biophysics, School of Medicine, University of Buffalo. 97 pp. Illust. $4.50. Charles C. Thomas, Springfield, Ill.; The Ryerson Press, Toronto, 1953.

The Adaptive Chin. E. L. DuBrul, Assistant Professor in Charge of Oral Anatomy, College of Dentistry, University of Illinois, Chicago; and H. Sicher, Professor of Anatomy and Head of Department, Loyola University School of Dentistry, Guest Lecturer, Northwestern University Dental School, Chicago, Illinois. 97 pp. Illust. $3.75. Charles C. Thomas, Springfield, Ill.; The Ryerson Press, Toronto, 1954.

The Hypertensive Disorders of Pregnancy. E. W. Page, Associate Professor Obstetrics and Gynecology, University of California School of Medicine, San Francisco, California. 120 pp. $4.25. Charles C. Thomas, Springfield, Ill.; The Ryerson Press, Toronto, 1953.

Resuscitation of the Newborn. J. D. Russ, Assistant Professor of Pædiatrics, Tulane University School of Medicine, Senior Pædiatrician Touro Infirmary, New Orleans, Louisiana. 55 pp. Illust. $2.75. Charles C. Thomas, Springfield, Ill.; The Ryerson Press, Toronto, 1953.

Treatment of Toxic Goiter with Radioactive Iodine. L. Seed, Director, Isotope Laboratory, Grant Hospital, Clinical Associate Professor of Surgery, College of Medicine, University of Illinois; and T. Fields, Assistant Director, Radioisotope Laboratory, Hines Hospital. 116 pp. Illust. $4.25. Charles C. Thomas, Springfield, Ill.; The Ryerson Press, Toronto, 1953.

Continued on page 70

MODERN TREATMENT YEARBOOK 1954

Edited by Sir Cecil Wakeley, Bt., K.B.E., C.B., LL.D., M.Ch., D.Sc., F.R.C.S., F.R.S.E., F.R.S.A., F.A.C.S., F.R.A.C.S.

352 pages, 69 illustrations. 1954. Price $3.60.

Specially designed to keep the practitioner informed on the practical application of the latest research. It provides the latest accepted method of diagnosis and treatment.

FORENSIC MEDICINE

By Douglas J. A. Kerr, M.D., F.R.C.P.E., D.P.H., Regius Professor of Forensic Medicine, University of Edinburgh.

Fifth Edition, 1954. 361 pages, 63 illustrations. Price $4.75.

The entire text of this well established book has been reviewed and brought up to date, and the statistics revised. The author has included a new chapter giving a brief historical outline of the subject.

THE MACMILLAN COMPANY OF CANADA LIMITED
70 Bond Street • Toronto 2, Ontario

OXFORD
MEDICAL PUBLICATIONS

MEDICAL TREATMENT OF DISEASE
By H. A. CHRISTIAN, D. G. FRIEND, *and* M. A. SCHNITKER. *Loose-Leaf Format for simplified future revisions. 985 pp.* $26.25

NEW YORK ACADEMY OF MEDICINE
SECTION ON MICROBOLOGY

Symposium Number Six
THE EFFECT OF ACTH AND CORTISONE UPON INFECTION AND RESISTANCE
Edited by GREGORY SCHWARTZMAN. *211 pp., with 59 half-tone plates, 19 text-figures, and 30 tables.* $5.75

Symposium Number Seven
STREPTOCOCCAL INFECTIONS
Edited by MACLYN MCCARTY. *225 pp., with 2 half-tone plates, 31 text-figures, and 37 plates.* $5.25

OXFORD UNIVERSITY PRESS

JOURNAL OF

Canadian Medical Association

Editorial offices — 3640 University St., Montreal 2
General Secretary's office — 244 St. George St., Toronto 5

Subscription rates: The Journal is supplied only to paid up members of the Canadian Medical Association with the following exceptions: for medical libraries, hospitals and doctors residing outside of Canada, the annual subscription is $10.00; for medical students residing in Canada there is a special rate of $2.50 per annum. All subscriptions and related correspondence should be addressed to the General Secretary's office at 244 St. George Street, Toronto 5, Ontario.

Contributors: Articles are accepted on condition that they are contributed solely to this Journal. Material contributed to this Journal is covered by copyright, and permission must be obtained for its reproduction either in part or in whole.

Manuscripts must be typewritten, double spaced, and the original copy.

Papers should be kept below 4,000 words wherever possible. Whilst not necessarily a cause for rejection, excessive length of an article is undesirable.

References: in the case of a journal arrange as follows: author (JONES, A. B.), title, journal, volume, page, year. In the case of a book: WILSON, A., Practice of Medicine, Macmillan, London, 1st ed., p. 120, 1922.

Illustrations: A limited number will be accepted. Photographs should be clear: drawings should be in india ink on white paper. All unmounted. Legends to be typed separately.

Reprints: May be ordered upon forms sent with galley proofs.

News: The Editor will be glad to consider any items of news that may be sent in by readers.

The Royal College of Physicians and Surgeons of Canada

ANNOUNCEMENT OF EXAMINATIONS

Examinations are held for the Fellowship in Medicine and the Fellowship in Surgery, and for the Certificate in the approved medical and surgical specialties.

Applications for the 1954 Examinations will be received until **April 30, 1954.**

Regulations and Requirements of Graduate Training relating to the Examinations, as revised May 1951, application forms, lists of approved hospitals in Canada, and assessment of training application forms, may be obtained from:

The Honorary Secretary
The Royal College of Physicians and Surgeons of Canada
150 Metcalfe Street, Ottawa, Canada.

CLASSIFIED ADVERTISEMENTS

Send copy to Canadian Medical Association, 3640 University Street, Montreal, not later than the fifteenth of the month previous to issue.

Rates: $3.00 for each insertion of 40 words or less, additional words 5c each.

If a box number is requested, there will be an additional charge of 50c on the first advertisement to cover postage and handling charges.

NOTICE.—THE DEFENCE RESEARCH BOARD REQUIRES GRADUATES IN MEDICINE OR VETERINARY MEDICINE for post-graduate training in bacteriology. Applications are invited from Canadian citizens or British subjects who are graduates in either medicine or veterinary medicine and who have had some internship or post-graduate training. Successful applicants will undertake three years of post-graduate training in bacteriology and immunology preferably leading to the Ph.D. degree. At the discretion of the Board, the first year may be spent at a designated university, and the remaining two years may be spent at a research laboratory. The first year will be probationary. The starting salary of $3,000 per annum may be increased during the second and third years to $4,000 and $5,000. At the discretion of the Board, successful applicants must remain with it for at least one year following the three years' training. In the Board's establishments, modern well-equipped laboratories provide excellent facilities and working conditions for the individual scientist. Superannuation and medical-hospital insurance plans are in effect. Liberal provision is made for vacation and sick leave. Excellent opportunities are presented for keeping abreast of latest developments and for broadening knowledge and experience through contact with leading scientists in Canada, the United States and the United Kingdom and through participation in programmes involving joint endeavours. To obtain application forms write to Director of Research Personnel, Defence Research Board, Department of National Defence, "A" Building, Ottawa, Ontario, Canada. Please quote competition number 54-DRKL-1. This competition closes August 15, 1954.

NOTICE.—Applications will be received for the residency in obstetrics and gynæcology at the Royal Alexandra Hospital, Edmonton, up to April 30, 1954. This service is available to those who have had two years' post-graduate training, one year of which must be in obstetrics and gynæcology. There are approximately 350 deliveries per month and there are 40 gynæcological beds. The salary is $125.00 per month, plus maintenance. The service commences July 1, 1954. Apply to Superintendent, Royal Alexandra Hospital, Edmonton.

NOTICE.—THE RESEARCH INSTITUTE OF THE HOSPITAL FOR SICK CHILDREN, TORONTO, CANADA. RESEARCH FELLOWSHIP IN NEUROLOGY. Applications invited from medical graduates (male or female) with training in pædiatrics or neurology. Duties will consist chiefly of investigation of convulsive disorders in young children by clinical and laboratory methods, under the direction of Dr. J. S. Prichard. Post vacant May 1, 1954. Salary $5,000. Preference given to persons prepared to work for a two-year period. Applications, with names and addresses of two referees to be submitted immediately to Dr. A. J. Rhodes, Director, The Research Institute, The Hospital for Sick Children, 555 University Avenue, Toronto, Canada.

EXCHANGE HOSPITALITY.—U.K. specialist, 50 and adaptable, formerly resident in Canada but now living in London, seeks hospitality at Barrie, Ont., in July while visiting his son in summer training at Borden. In return he and his family, including 18 year old daughter, offer hospitality to a Canadian youngster in their London house any time. Dr. and Mrs. Ling, 3 Paultons Square, Chelsea, London S.W. 3, England.

WANTED TO BUY.—Hasslinger Bronchoscope in usable condition. Reply to Box 872, Canadian Medical Association Journal, 3640 University Street, Montreal.

FOR RENT.—Medical office at 948 Main Street East, Hamilton, Ontario. Has common waiting room with dermatologist, excellent location for another specialist. Apply Dr. L. T. Williamson, at above address.

FOR RENT.—Spacious office suitable for certified pædiatrician, in Guelph, Ontario, a city now without a pædiatrician, and with excellent hospital facilities. Apply to Box 788, Canadian Medical Association Journal, 3640 University Street, Montreal, Que.

FOR SALE.—Established medical office for 21 years, located in the most busy street in a flourishing city in Ontario. Apply to Box 790, Canadian Medical Association Journal, 3640 University Street, Montreal, Que.

Continued on Page 36

Anytime...

Anywhere

Gratifying Relief

from Pain,

Urgency,

and Frequency

Whenever distressing

symptoms of

urogenital infection occur—

Wherever the patient

may be...:

PYRIDIUM acts fast. Within a matter of minutes, it affords safe, local analgesia to soothe the irritated urogenital mucosa in cystitis, prostatitis, urethritis, and pyelonephritis. PYRIDIUM is compatible with antibiotics, MANDELAMINE, the sulfonamides, or other specific therapy.

PYRIDIUM

(Brand of Phenylazo-diamino-pyridine HCl)

PYRIDIUM and MANDELAMINE are registered trade-marks of Nepera Chemical Co., Inc., Merck & Co. Limited, sole distributor in Canada.

MERCK & CO. LIMITED

Manufacturing Chemists

MONTREAL · TORONTO · VANCOUVER · VALLEYFIELD

Thirty Years Ago . . .

From the *Journal* of April, 1924

The Windsor Outbreak of Smallpox

"The recent epidemic of smallpox in Windsor and its vicinity has been of a particularly virulent type. The facts concerning the epidemic are briefly as follows: A mild epidemic of smallpox had been present in Detroit for the past three or four months. Owing to the proximity of the Border Cities it was inevitable that cases of smallpox should appear in Windsor and other neighbouring municipalities in Ontario. Some cases developed as expected in the Border Cities, but they were of a mild character, occasioned no alarm, and were promptly dealt with by the Health Department. An epidemic of malignant smallpox, however, broke out in Windsor about the middle of February, following the death of a man suffering from an irregular type of hæmorrhagic smallpox. This man during his illness, was seen by several medical men of the highest reputation, but no one believed that the patient was suffering from a communicable disease. During his illness the man was visited by many friends and relatives and when death occurred his funeral was very largely attended. It was only when cases occurred in persons who had been in contact with this man that the diagnosis of smallpox was definitely made. These cases were of a particularly virulent and irregular type."

Surgery and Surgeons

"To the Editor:

A short time ago a marked copy of *Harper's Magazine* containing an article entitled 'The New Control of Surgeons' was sent to every Fellow of the American College of Surgeons in this locality, and presumably throughout both the United States and Canada. The said article condemned in a general way the present state of surgery, and extolled the rescue work undertaken by the American College of Surgeons. It has given rise to much surprise in our district, and surmises are rife as to whether the author may not be a member, or perhaps an official of the college. The writer makes very broad statements and accusations, which to the members of the College in Canada do not appear to be warranted. The statement that surgeons generally are in the habit of splitting fees is, so far as I know, a falsehood, as regards Canadian Surgeons. There may be black sheep in every flock. There may be fee splitters under the wing of the American College of Surgeons, but that this holds true generally I do not believe, and, made in such a public way, I regard the statement as a most dangerous generalization. I regard the whole of this article as a most exaggerated and unfair accusation, and am surprised to think that such a maligning of the profession should be allowed to appear in a respectable journal like *Harper's Magazine*. While I speak in this way of this, in my opinion, most unjust article, I desire on the other hand to recognize that the American College of Surgeons has rendered, and is rendering, valuable services to the profession and to the community in general by insisting upon higher standards, on careful note taking, and emphasizing the necessity for an improvement in many of the smaller hospitals by increasing their laboratory equipments.

Eug. St. Jacques,
Prof. of Clinical Surgery,
University of Montreal."

Nova Scotia News

"A suggestion for the diagnostician in distress is contained in the following excerpt from a news item relative to a disabled steamer which was recently towed into Halifax Harbour: 'Only one passenger is aboard the *Poland*. This passenger is a woman belonging to New York, who is on her way to Europe. It is understood that she is suffering from illness brought on by her rough experience. A survey was held yesterday and a diver will go down this morning to learn if her sternpost or rudder is damaged'."

New Brunswick News

"The question of fee-splitting may soon have to be considered in one of the Saint John standardized hospitals but as with chiropractors it is difficult to secure absolute proof of the alleged financial dealings. The doctor concerned in these unethical proceedings has signed the promise to abide by the rules of standardization and if there be any truth in the rumours re division of fees, it is hoped that he will realize the importance of keeping his pledge and will in future observe the spirit as well as the letter of the law."

"It is too bad that we have not any means of disciplining those of the profession who split fees, encourage chiropractors, and are unethical in their charges and general intercourse with the public. We are far too easy going. In no other organization would a member be allowed to flout the rules with impunity. Such men usually play a lone game and are immune to professional ostracism. The only way to impress them is through the pocketbook and how to do that effectively is not apparent."

British Columbia News

"Perhaps the most important matter under the consideration of the B.C. Medical Association at present is "Health Insurance", and whilst of course, no definite steps have been, or can be taken, work is proceeding and progress is being made. A committee has been appointed to consider how best to obtain the views of other organizations in this subject. This committee contemplates inviting members of labour and other organizations to a conference when the whole matter will be discussed."

in rheumatoid arthritis
anti-inflammatory potency
with Cortef*
brand of hydrocortisone (compound F)
Cortef tablets
10 mg. each, in bottles of 25
*TRADEMARK
Literature available on request
Upjohn Fine pharmaceuticals since 1886
The Upjohn Company of Canada, 384 Adelaide Street, West, Toronto

Fellows

COMPOUND

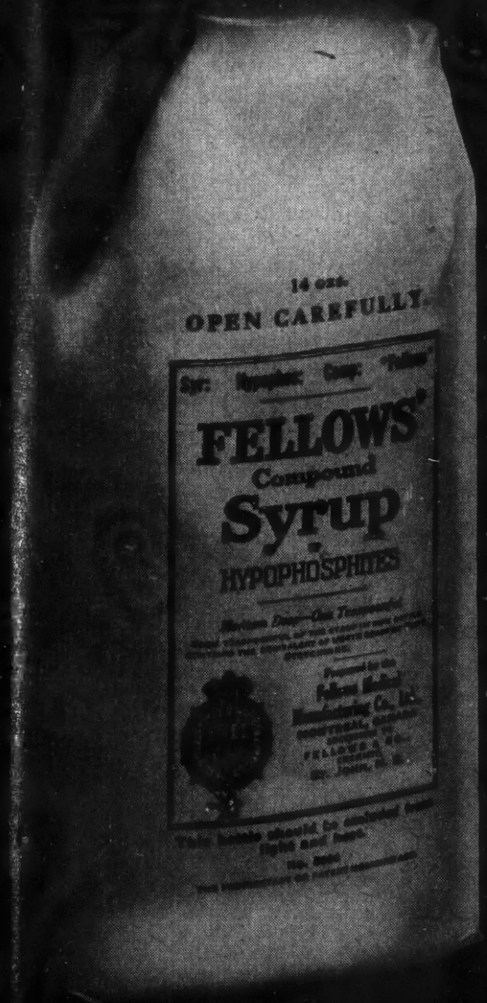
Syrup

C

IRON

QUININE

STRYCHNINE



FELLOWS SYRUP is:

Especially valuable for *Geriatric patients* and during convalescence.

FELLOWS SYRUP will

- Stimulate appetite
- Improve muscle tone
- Elevate the mood without after depression

Economically priced...less than 2¢ per dose to patient

Each teaspoonful (4 cc.) contains:

Strychnine Hydrochloride	1 mg.
Quinine Sulfate	3 mg.
Calcium Hypophosphite	20 mg.
Iron Pyrophosphate	8 mg.
Manganese Hypophosphite	8 mg.
Potassium Hypophosphite	8 mg.
Sodium Hypophosphite	8 mg.

Available: 14-oz. Bottles

Samples? Of course, on your request!

Fellows
MEDICAL MFG. CO., LTD.
Pharmaceuticals

386 St. Paul Street West
Montreal, Canada.

pharmaceuticals since 1366

Books Received

Chronic Iliac Pain in Women. H. B. Atlee, Head of the Department of Obstetrics and Gynecology, Dalhousie University, Halifax, N.S. 65 pp. Illust. $2.50. Charles C. Thomas, Springfield, Ill.; The Ryerson Press, Toronto, 1954.

Michael Servetus. C. D. O'Malley. 208 pp. $3.00. American Philosophical Society, Philadelphia, 1953.

Medical History of The Second World War.—Surgery. Edited by Sir Z. Cope. (History of the Second World War, United Kingdom Medical Series, Editor-in-Chief, Sir A. S. MacNalty). 772 pp. Illust. 80s. Her Majesty's Stationery Office, London, 1953.

The Pharmaceutical Pocket Book. Published by direction of the Council of the Pharmaceutical Society of Great Britain. 422 pp. 16 ed., 18s. 6d. The Pharmaceutical Press, London, 1953.

Textbook of Physiology. C. E. Stackpole, Formerly Associate in Biology, Teachers College, Columbia University; and L. C. Leavell, Associate Professor in Nursing Education, Teachers College, Columbia University. 418 pp. Illust. $5.00. The Macmillan Company of Canada Ltd., Toronto 2, 1953.

Clinical Chemical Pathology. C. H. Gray, Professor of Chemical Pathology, University of London; Chemical Pathologist, King's College Hospital, London. 138 pp. Illust. $1.80. Edward Arnold & Co., London; The Macmillan Company of Canada Ltd., Toronto 2, 1953.

Salt and The Heart. E. T. Yorke, Attending Cardiologist, Alexian Brothers Hospital; Associate Cardiologist, St. Elizabeth Hospital, Dispensary Physician, Elizabeth General Hospital, Elizabeth, N.J. 83 pp. Illust. $3.45. Drapkin Books, Linden, N.J., 1953.

Facial Deformities and Plastic Surgery. F. C. MacGregor and others. 230 pp. Illust. $6.25. Charles C. Thomas, Springfield, Ill.; The Ryerson Press, Toronto, 1953.

Natural History of Infectious Disease. Sir MacF. Burnet, Director of the Walter and Eliza Hall Institute, Melbourne. 356 pp. $3.85, 2nd ed. Cambridge University Press, Cambridge; The Macmillan Company of Canada Ltd., Toronto 2, 1953.

Ulcerative Colitis and its Surgical Treatment. B. N. Brooke, Reader in Surgery, University of Birmingham. Examiner in Surgery, University of Birmingham. 147 pp. Illust. $6.35. E. & S. Livingstone Ltd., Edinburgh and London, The Macmillan Company of Canada Ltd., Toronto 2, 1954.

The Thyroid T. Levitt, Hunterian Professor of the Royal College of Surgeons of England; Lecturer in Surgery to the Fellowship of Post-graduate Medicine at the New End Hospital, Hampstead, London. 606 pp. Illust. $17.90. E. & S. Livingstone Ltd., Edinburgh and London; The Macmillan Company of Canada Ltd., Toronto 2, 1954.

Nash's Surgical Physiology. Edited by B. Blades, Professor of Surgery, The George Washington University School of Medicine. 686 pp. Illust. $13.75, 2nd ed. Charles C. Thomas, Springfield, Ill.; The Ryerson Press, Toronto, 1953.

The Practical Management of Diabetes. E. Tolstoi, Associate Professor of Clinical Medicine, Cornell University Medical College; Attending Physician and Chief, Diabetic Hospital, The New York Hospital. 93 pp. $3.50. Charles C. Thomas, Springfield, Ill.; The Ryerson Press, Toronto, 1953.

Metabolic and Toxic Diseases of the Nervous System. Edited by H. H. Merritt, and C. C. Hare. 604 pp. illust., $10.00. Vol. XXXII, The Williams & Wilkins Co., Baltimore; Burns & MacEachern, Toronto 2, 1953.

Mammalian Germ Cells. A Ciba Foundation Symposium. Edited by G. E. W. Wolstenholme, 302 pp. illust., $6.00. J. & A. Churchill Ltd., London W.1; British Book Service (Canada) Ltd., Toronto 6, 1953.

Disorders of the Blood. Sir Lionel E. H. Whitby, Regius Professor of Physic in the University of Cambridge; and C. J. C. Britton, Physician and Hæmatologist to the Prince of Wales's Hospital, London. 856 pp. illust., 7th ed. $12.75. J. & A. Churchill Ltd., London W.1; British Book Service (Canada) Ltd., Toronto 6, 1953.

Music Therapy. Edited by E. Podolsky, Department of Psychiatry, Kings County Hospital, Brooklyn, N.Y. 335 pp. illust., $6.00. Philosophical Library, New York, 1954.

Epilepsy and the Functional Anatomy of the Human Brain. W. Penfield, and H. Jasper. 896 pp. illust., $16.00. Little, Brown and Company, (Canada) Ltd., Toronto 13, 1954.

Cell Chemistry. Edited by D. Burke. 362 pp. illust., $7.50. The Elsevier Press, Houston, Texas, 1953.

Connective Tissues. Edited by C. Ragan, Associate Professor of Medicine, Columbia University. 197 p. illust., $3.75. Sponsored by the Josiah Macy, Jr. Foundation, New York, 1953.

Administrative Medicine. Edited by G. S. Stevenson, Medical Director, National Association for Mental Health, New York. 176 pp. illust., $3.00. Sponsored by the Josiah Macy, Jr. Foundation, New York, 1953.

The Chest. A Handbook of Roentgen Diagnosis. L. G. Rigler, Professor and Chief, Department of Radiology, University of Minnesota. 380 pp. illust., 2nd ed., $8.00. The Year Book Publishers, Inc., Chicago; Burns & MacEachern, Toronto 2, 1954.

Frontal Lobes and Schizophrenia. Edited by M. Greenblatt, Assistant Clinical Professor in Psychiatry, Harvard Medical School; and H. C. Solomon, Professor of Psychiatry, Harvard Medical School. 425 pp. illust., $12.50. Springer Publishing Company, Inc., New York; Burns & MacEachern, Toronto 2, 1953.

Parsons' Diseases of the Eye. Sir Stewart Duke-Elder, Surgeon-Oculist to the Queen; Director of Research Institute of Ophthalmology, University of London. 606 pp. illust., 12th ed., $8.50. J. & A. Churchill Ltd., London, W.1.; British Book Service (Canada) Ltd., Toronto 6, 1954.

Breaking Patterns of Defeat. R. L. Jenkins, Chief of Psychiatric Research, Psychiatry and Neurology Service, Veterans Administration, Washington, D.C. 270 pp. illust., $6.75. J. B. Lippincott Company, Montreal, 1954.

Manic-Depressive Disease. J. D. Campbell, Diplomate, American Board Psychiatry and Neurology. 403 pp. illust., $6.75. J. B. Lippincott Company, Montreal, 1953.

Understanding the Japanese Mind. J. C. Moloney. 252 pp., $3.50. Philosophical Library, New York, 1954.

An Rh-Hr. Syllabus. Modern Medical Monographs No. 9. A. S. Wiener, Senior Bacteriologist (Serology) to the Office of the Chief Medical Examiner of New York City; Assistant Professor, Department of Forensic Medicine, New York University Postgraduate Medical School. 82 pp. illust., $4.25. Grune & Stratton, New York, The Ryerson Press, Torono, 1954.

Acute Pulmonary Edema. Modern Medical Monograhs No. 10. M. D. Altschule, Assistant Professor of Medicine, Harvard Medical School. 68 pp., $3.75. Grune & Stratton, New York; The Ryerson Press, Toronto, 1954.

Prematurity, Congenital Malformation and Birth Injury. Proceedings of a Conference Sponsored by Association for the Aid of Crippled Children, June 5 and 6, 1952. 255 pp. illust., $4.00. Association for the Aid of Crippled Children, New York 17, N.Y., 1953.

Manuel Pratique de Vaccination par le B.C.G. R. Mandé, Médecin des Hôpitaux de Paris. 200 pp. illust. 950 fr. Le Centre International de l'Enfance, Paris, 1954.

Clinical Endocrinology. K. E. Paschkis, Associate Professor of Medicine, Director of the Division of Endocrine and Cancer Research, Jefferson Medical College; A. E. Rakoff, Clinical Professor of Obstetrics and Gynecologic Endocrinology, Jefferson Medical College; and A. Cantarow, Professor of Biochemistry, Jefferson Medical College. 830 pp. illust. $16.00. Paul B. Hoeber, Inc., New York 16, 1954.

Atlas of Exfoliative Cytology. G. N. Papanicolaou, Clinical Professor of Anatomy Emeritus, Cornell University Medical College, $18.00. Published for the Commonwealth Fund by Harvard University Press, Cambridge, Mass., 1954.

The Bible and Modern Medicine. A. R. Short, Emeritus Professor of Surgery, University of Bristol. 142 pp. 6/-. The Paternoster Press, London, W.C.1, 1953.

Kinsey's Myth of Female Sexuality. E. Bergler, Formerly Assistant Director of the Freud-Clinic in Vienna and Lecturer at the New York Psychoanalytic Institute; and W. S. Kroger, Associate Clinical Professor of Gynecology, Chicago Medical School. 200 pp. $4.00. Grune & Stratton, New York; The Ryerson Press, Toronto, 1954.

Hypnotherapy in Clinical Psychiatry. H. Rosen. 313 pp. $5.75. The Julian Press, Inc., New York; The Copp Clark Co. Ltd., Toronto, 1953.

Bacteriology for Medical Students and Practitioners. A. D. Gardner, Regius Professor of Medicine, Oxford Student of Christ Church, one time Professor of Bacteriology and Fellow of University College, Oxford. 271 pp. illust., 4th ed. $2.00. Oxford University Press, Toronto, 1953.

Pharmacology. J. H. Gaddum, Professor of Pharmacology in the University of Edinburgh. 562 pp. illust. 4th ed. $5.25. Oxford University Press, Toronto, 1953.

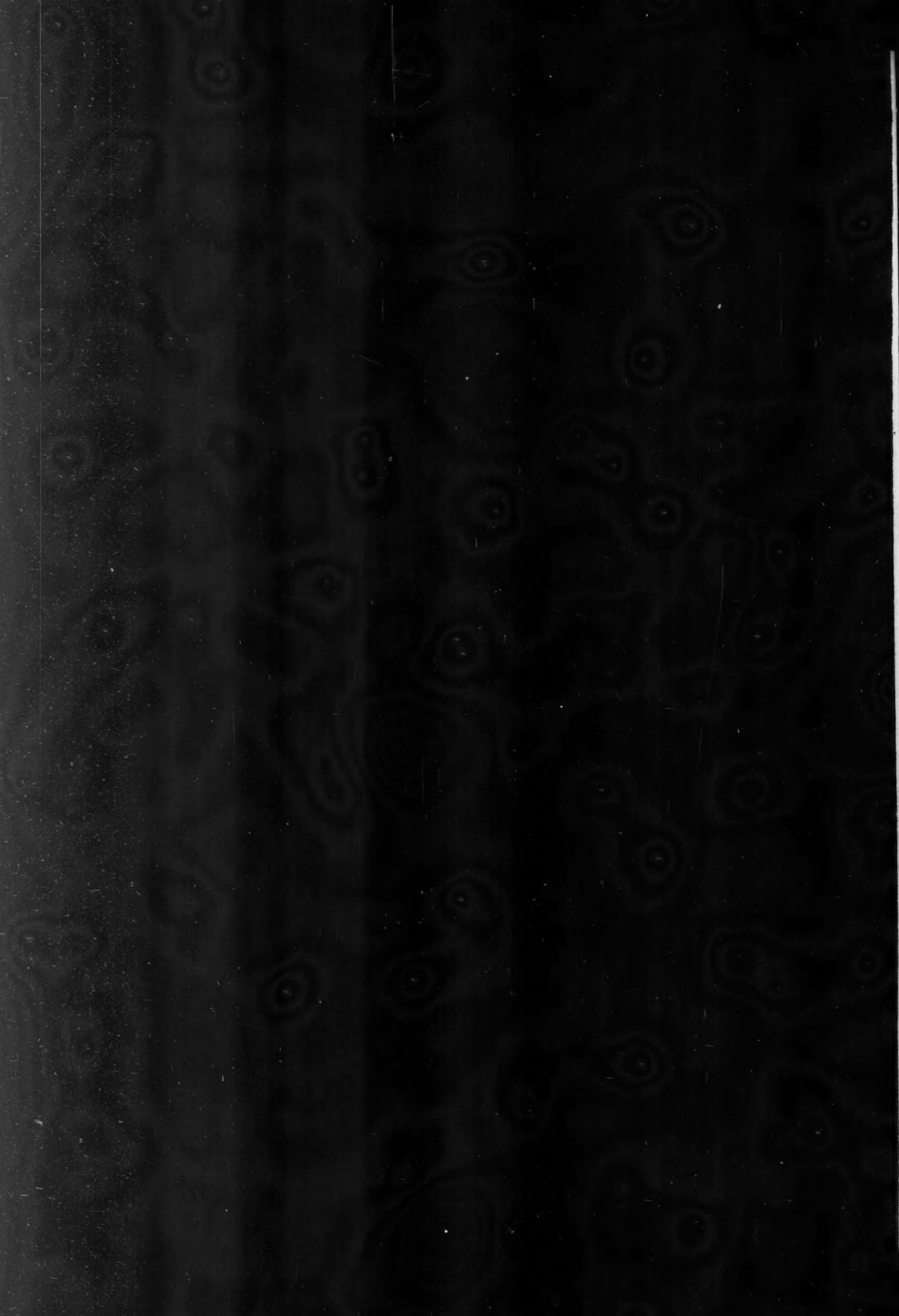
Medical History of the Second World War. The Royal Naval Medical Service. Edited by J. L. S. Coulter. Vol. I, 512 pp. 50s. Her Majesty's Stationery Office, London E. C. I, 1954.

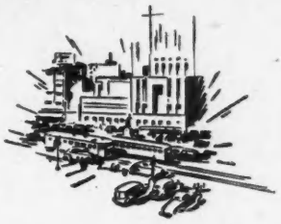
Methods of Examination in Ear, Nose and Throat. W. G. Scott-Brown, Ear, Nose and Throat Surgeon, Royal Free Hospital, London. 110 pp. illust. $3.75. Butterworth & Co. (Canada) Ltd., Toronto, 1954.

Modern Trends in Diseases of the Ear, Nose and Throat. Edited by M. Ellis, Surgeon to the Royal National Throat, Nose and Ear Hospital, London. 471 pp. illust. $13.00. Butterworth & Co. (Canada) Ltd., Toronto, 1954.

Cold Injury. Edited by M. I. Ferrer, Assistant Professor of Clinical Medicine, Columbia University College of Physicians and Surgeons, New York. 242 pp. illust. $4.00. Josiah Macy, Jr. Foundation, New York, 1954.

British Surgical Practice. Surgical Progress, 1953. Under the General Editorship of Sir Ernest Rock Carling, Consulting Surgeon, Westminster Hospital, and Sir James Paterson Ross, Surgeon and Director of Surgical Clinical Unit, St. Bartholomew's Hospital. 376 pp. illust. Butterworth & Co. (Canada) Ltd., Toronto, 1953.





Hypertension is a Daytime Disease .....Butisol is a Daytime Sedative[1]

Referring to Butisol in the management of many functional disorders and for the treatment of nervous tension and anxiety associated with such conditions as hypertension, Dripps[1] states: "its greatest usefulness should be in the field of daytime sedation."

Control of the hypertensive patient throughout the day is admittedly difficult, but the type of sedation—"Intermediate Sedation"—provided by Butisol gives the effect you desire.

"Sedation is sustained for approximately five or six hours."[2] Thus, Butisol is suited to the production of a mild and more continuous sedation than can be obtained with the short-acting barbiturates.

The gentle sedation of Butisol makes it possible to maintain a lowered basal blood pressure, without hindering the patient's normal activities.

Tablets Imprinted, 'McNeil'

BUTISOL® SODIUM

BUTABARBITAL SODIUM, McNEIL

Convenient Dosage Forms:

- Tablets, 15 mg. (¼ gr.), lavender
- Tablets, 30 mg. (½ gr.), green
- Tablets, 50 mg. (¾ gr.), orange
- Tablets, 0.1 Gm. (1½ gr.), pink

Elixir Butisol Sodium, 0.2 Gm. (3 gr.) per 30 cc. (1 fl. oz.), green. Samples on request.

1. Dripps, R.D.: Selective Utilisation of Barbiturates, J.A.M.A. *139*:150 (Jan. 15) 1949.
2. Council on Pharmacy & Chemistry: New and Nonofficial Remedies, 1953, Philadelphia, J. B. Lippincott Co., 1953, p. 252.

McNEIL

LABORATORIES, INC.
PHILADELPHIA 32, PA.

Distributed through leading pharmacies by:
Van Zant & Company
357 College Street, Toronto, Ontario

NEWS AND NOTES

(Continued from page 490)

is a forward step. It complemented the considerable increase in psychiatric services made available to the Ottawa area during the past five years such as the development of a very active psychiatric unit at the Ottawa General Hospital with wide expansion of outpatient activities at both the Ottawa General and Ottawa Civic Hospitals.

Funds provided under the Mental Health Grant will assist in providing the services of a part-time neuropathologist, a neuropathological technician, as well as technical equipment.

"CHICAGO—BURNT CHILD DIES DUE TO NEGLIGENCE"

A news story of a transfer between hospitals, of death, and charges that this life would have been saved if proper care had been given. Few other facts were reported, there being no mention of degree or extent of burns. In your community and in mine our friends read this story and remembered vague and not so vague episodes concerning that hospital and this doctor. Much table conversation was afforded.

How best may doctors handle such stories?

There is no need to deny that something may be wrong.

Be alert for attempts to draw you into hasty conclusions.

If enough facts are known to pass honest judgment, talk if you wish, but hesitate if you do not know all the facts. Your statement that all the facts may not be known, that you and perhaps others cannot pass sound judgment upon partial evidence will cause many to withhold judgment.

No effort is as important as your calm statement that all the facts must be established before judgment is passed.—From *West Virginia State Med. Assoc. Pub. Relations Bull.*

We note that a new medical journal is to be published in India. This is *The Journal of the Medical Profession*: The publishers are Messrs. A. MacRae & Co., Bombay, and the Editor will be Dr. F. D. Bana, M.B., M.R.C.S. The publishers will welcome original articles and case reports.

THE KIMBLE METHODOLOGY RESEARCH AWARD

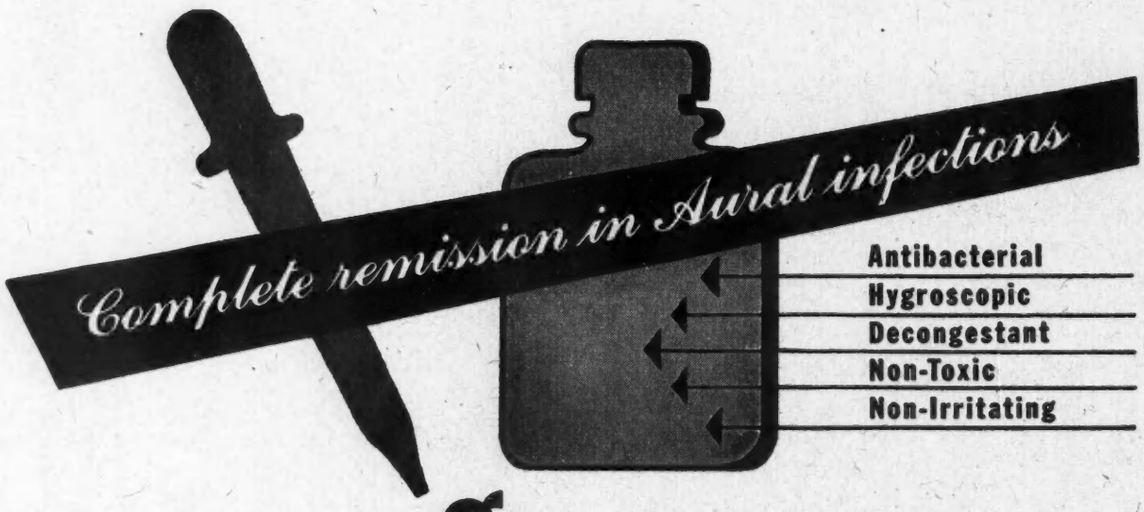
The Kimble Methodology Research Award of $500.00 carries the following conditions.

1. The candidate's work to be considered for nomination should be either: (a) A fundamental contribution which serves as a base line for development of diagnostic methods which fall within the province of the public health laboratory. (b) The adaptation of a fundamental contribution to make it of use in a diagnostic laboratory.

2. The geographical area from which candidates for nomination are to be drawn should be the United States, its territories, and Canada.

3. To be eligible for consideration for nomination in any year, the work should have been completed within the preceding five years; that is, work completed since January 1, 1949.

(Continued on page 82 of the advertising section)



glycerite
of Hydrogen Peroxide ipc with Carbamide

Instill one-half dropperful into affected ear four times daily

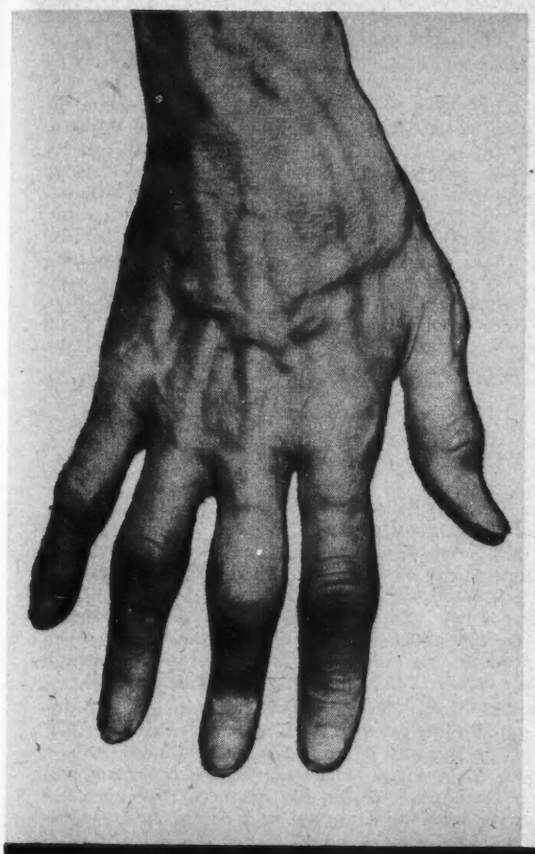
Supplied in one-ounce bottles with dropper

Samples and Literature on request

Constituents:
Hydrogen Peroxide 1.5%
Urea (Carbamide) 2.5%
8 Hydroxyquinoline 0.1%
Dissolved and stabilized in substantially anhydrous glycerol q.s.ad. 30cc.

International Pharmaceutical Corporation

132 Newbury Street, Boston 16, Massachusetts



within reach

of the average arthritic

for rapid relief of pain and functional improvement

BUTAZOLIDIN is the totally new, synthetic, non-hormonal, orally effective drug now being widely prescribed for the relief of arthritis and allied disorders. Of proved value in a wide variety of conditions—notably

- **Rheumatoid Arthritis**
- **Osteoarthritis**
- **Gout**
- **Bursitis**
- **Spondylitis**
- **Psoriatic Arthritis**

BUTAZOLIDIN (brand of phenylbutazone)

for relief of

ARTHRITIS

and allied disorders

Characteristically, BUTAZOLIDIN:

- Relieves pain in approximately 3 of every 4 cases.
- Produces functional improvement by reducing swelling and spasm and increasing mobility.
- Does not lose effectiveness on continued use.

In order to ensure optimal results with minimal risk of side reactions, physicians are urged to consult the detailed literature on BUTAZOLIDIN available on request.

BUTAZOLIDIN (brand of phenylbutazone): Sugar-coated tablets 100 mg., bottles of 100, 250 and 1000.

Geigy

GEIGY PHARMACEUTICALS
Division of Geigy (Canada) Limited
286 St. Paul Street W., Montreal 1, Que.

NEWS AND NOTES

(Continued from page 80 of the advertising section)

4. Consideration will be given to nominations *only* if they are covered by a reprint or a summary with bibliography, and a statement of the considerations which justified the recommendations of the study.

5. Nominations received after May 15, 1954 will not be considered for the year 1954, but will be considered for nomination in 1955, providing the work is within the limits of the above Rule 3 effective during 1955.

6. Nomination of a piece of work where there is more than one author is permissible.

7. Send all nominations to: Alfred S. Lazarus, Ph.D., Chairman, Nominating Committee, Kimble Award, School of Medicine, University of Washington, Seattle 5, Washington.

FEDERAL HEALTH GRANTS FOR MANITOBA HOSPITALS

Federal funds in the amount of more than $16,000 will be made available to Manitoba to assist in extension of hospital accommodation in that province. Hospital Construction Grants under the National Health Program have been approved in connection with enlargement of the Fox Memorial Hospital, District 12A, Carberry, and the Manitoba Sanatorium, Ninette, Man. It is also announced that $9,033 would be contributed to assist in construction of seven new patient beds, three new nurses' beds and 160 square feet of x-ray laboratory space at the Fox Memorial Hospital. Work under way there will provide new operating, delivery and sterilizing rooms. Fox Hospital serves an area of 432 miles, with a population of some 3,000 persons. Manitoba Sanatorium at Ninette will be assisted in adding 15 new nurses' beds to its present nursing accommodation of 46 nurses' beds. The federal grant involved totals $7,500.

in atopic dermatitis
(allergic eczema)

efficacy

with **Cortef*** brand of hydrocortisone (compound F)

acetate ointment *in 5 Gm. tubes*

Concentrations of 2.5% (25 mg. per Gm.) and 1.0% (10 mg. per Gm.)

Literature available on request • *TRADEMARK

Upjohn *Fine pharmaceuticals since 1886*

THE UPJOHN COMPANY OF CANADA, 384 Adelaide Street, West, Toronto

AMERICAN ASSOCIATION FOR CLEFT PALATE REHABILITATION

The annual meeting of the American Association for Cleft Palate Rehabilitation will be held at the Webster Hall Hotel in Pittsburgh, Pennsylvania, May 14 and 15. The program will include special sectional meetings in the areas of medical-surgical problems, dental-prosthetic-orthodontic problems, and speech-psychology-education-social work. Motion pictures and special exhibits relating to cleft palate rehabilitation will be shown throughout the convention. The meeting will be open to any individual with an interest in cleft palate rehabilitation. Further information about the program may be obtained from Dr. S. M. Dupertuis, 3700 Fifth Avenue, Pittsburgh, Pennsylvania.

A WORKSHOP ON AGEING

Ageing—Everybody's Business is the title of the University of Michigan's Seventh Annual Conference on Ageing to be conducted as a workshop in Ann Arbor, Michigan, June 28 to 30, 1954. The workshop will provide participants with the opportunity to exchange ideas with persons of varied experience, to define responsibility for the tasks that lie ahead, and to establish bench-marks for the creation of an environment in which the senior citizen can enjoy life-long development.

Leaders in health, business, employment, labour, education, rehabilitation, social work, religion, housing, recreation, community organization, city planning, and government are invited to attend, as are members and officials of fraternal organizations, women's clubs, service organizations, retirement groups, and voluntary organizations.

Older people are especially invited. They will have the opportunity to gain a better understanding of their role, and their participation will focus attention upon issues with which they are most concerned.

For further information, write to Dr. Wilma Donahue, Chairman, Division of Gerontology, 1510 Rackham Building, Ann Arbor, Michigan.

With an increase of more than 2,700,000 people in 1953, the United States recorded the largest annual population gain in its history, according to Metropolitan Life Insurance Company statisticians. In the past eight years the population has increased by more than 20 millions; just prior to 1946 it took 17 years to produce an increase of this size. This recent population gain, the statisticians observe, exceeds by one-third the entire present population of Canada.

Every age group has contributed to the population growth, but preschool children show the largest gain. Since 1940, the number of children under 5 has increased by about two-thirds, compared with a rise of one-fifth in the total population. These youngsters now constitute 11% of the population, compared with 8% in 1940. The people at ages 65 and over have increased by nearly 50% since 1940, and now total about 13½ millions, or more than 8% of the population.

Grant of $57,500 to assist in the cost of financing a new Nurses' Home for St. Paul's Hospital, Vancouver, has been approved by the federal government. The funds will be provided to British Columbia under terms of the Hospital Construction Grant in the National Health Program, which is making possible considerable expansion of hospital as well as other health facilities all over Canada.

The funds granted for St. Paul's Hospital operated by the Sisters of Charity of British Columbia, will assist in providing the hospital with 87 additional nurses' beds

(Continued on page 84 of the advertising section)

the
new
oral
diuretic

DIAMOX offers new convenience for the patient. It is an oral diuretic that may be prescribed for regular use at home. Taken in the morning, DIAMOX produces prompt diuresis for six to twelve hours, permitting uninterrupted sleep at night.

DIAMOX is not a mercurial or xanthine derivative. A new and remarkably safe product, it produces no undesirable changes in the electrolytic balance of the body fluids. It produces diuresis by inhibiting the enzyme carbonic anhydrase. It is then excreted, quantitatively and unchanged, in the urine.

Available in scored tablets (250 mg.)

Dosage: 1 to 1½ tablets each morning, according to weight.

Diamox*

ACETAZOLEAMIDE LEDERLE

Lederle

*Registered Trade Mark

LEDERLE LABORATORIES DIVISION
North American Cyanamid Limited
5550 Royalmount Avenue
Town of Mount Royal, Montreal, Quebec

NEWS AND NOTES

(Continued from page 82 of the advertising section)

as well as 14 new recovery beds. The hospital already has 548 active treatment beds, three recovery beds and four labour beds. The new building now supported will provide accommodation for nurses in training and for postgraduate nurses, as well as an additional operating room floor, including viewing galleries, clinic rooms, recovery room and auditorium.

AMERICAN HEART ASSOCIATION

The latest annual report of the activities of the American Heart Association, a national voluntary health agency with affiliated heart associations in practically all of the States, has been set up against a historical background. Entitled "The Heart Story," this report traces the progress made in 30 years of work for and on behalf of sufferers from cardiovascular disease. The most interesting parts of the report to the physician are the sections on rehabilitation programs and on programs for the prevention of rheumatic fever. The publication is obtainable from American Heart Association, Inc., 44 East 23rd Street, New York 10.

POSTGRADUATE STUDY IN THE UNITED KINGDOM

The Empire Medical Advisory Bureau of the British Medical Association is well known to Canadian medical visitors in London. The Bureau has now issued a Summary of Regulations for Postgraduate Diplomas and of Courses of Instruction in Postgraduate Medicine, which will be of interest to anyone contemplating postgraduate work in the United Kingdom. Communications concerning the Summary should be addressed to the Medical Director, Empire Medical Advisory Bureau, B.M.A. House, Tavistock Square, London, W.C.1.

USELESS POSTOPERATIVE COUGH

Burnham* recommends the use of inhalation of 70% ethyl alcohol vapour in the prophylaxis of postoperative cough. The patient pours several teaspoonfuls of alcohol on a four by four gauze sponge; he exhales slowly and then inhales slowly, holding the gauze sponge near his mouth. The author states that this method frees the patient from irritating dry tickle, and also ameliorates the useful cough in exudative respiratory infections. It does not abolish the useful cough, but will make the useless "tickle cough" disappear.

At the annual meeting of the Montreal Ophthalmological Society held on Thursday, February 11, 1954, the following officers were elected for the season 1954-1956; appointments to be effective from October 1, 1954: President, Dr. A. L. Guertin, 837 Cherrier St.; Vice-president, Dr. R. J. Viger, 1414 Drummond St.; Secretary, Dr. Wm. Turnbull, 1414 Drummond St.; Treasurer, Dr. C. Monfette, 364 Sherbrooke St. E.

PROGNOSIS IN GLOMERULONEPHRITIS

As Richard Bright grew older, he modified his views on the prognosis in diffuse glomerulonephritis, and there has also been a tendency recently towards less pessimism in this condition. Some information from the Mayo Clinic will encourage physicians who may have felt that treatment results in diffuse glomerulonephritis are not particularly good. In a short paper, Keith† describes the outcome of a follow-up study of 50 cases, whose history over a period of 10 years was available.

There were eight cases of acute diffuse glomerulonephritis, all in men; all the patients recovered and have

*P. J. Burnham: *Quart. Bull. Northwestern University Med. School*, 28: 76, 1954.
†*Proc. Mayo Clin.*, 29: 83, 1954.

(Continued on page 85 of the advertising section)

This Diagnostic Set for the examination of Ear, Eye, Nose and Throat, incorporates all possible improvements which have come to light during the past 20 years.

All the bright parts are finished in untarnishable chromium plate of super-excellent quality. Non-ferrous and entirely rustless alloys are used throughout, and the heavier parts, such as the Battery Handle, are made of light alloy. Housed in a handsome hard-wearing box, fitted with a newly designed catch, the Instruments will always be ready for instant use and prove to have a remarkably long and trouble-free life.

CONTENTS
Improved May Ophthalmoscope
Auriscope with 3 interchangeable specula
Throat Lamp
1 each Laryngeal and Post Nasal Mirror
Tongue Depressor
Large Battery Handle and Spare Lamp
Complete in case ..... Cat. No: 3004

Made in England. Obtainable from all Surgical Instrument Dealers

Gowland
electric diagnostic instruments

NEWS AND NOTES

(Continued from page 84 of the advertising section)

remained well for 10 to 26 years. In four of these cases, there was a diagnosis of lipoid nephrosis. There were also records of four patients with chronic glomerulonephritis who recovered and have remained well for from six to 20 years, and of 34 patients in whom this disease became arrested. Of the latter group, one lived for 41 years and others for from 10 to 30 years. The author believes that the number of patients with chronic nephritis who are leading restricted but useful lives is increasing.

DUKE UNIVERSITY SCHOOL OF MEDICINE, DURHAM, NORTH CAROLINA

A course in Medical Mycology has been offered continuously during the summer for the past seven years at Duke University School of Medicine and Duke Hospital. The course will be offered again this summer and has been designed to give the student a working knowlelge of the human pathogenic fungi and an understanding of the diseases which they cause.

Instruction by members of the departments of medicine, pathology and bacteriology will emphasize the clinical, pathological and therapeutic aspects of fungus infections. Patients, clinical materials, cultures and laboratory animals will be available for study. An opportunity to study pathological materials, gross and microscopic, will be given those whose interest and previous training would make this of value to them. The practical laboratory aids which help to establish a definitive diagnosis will be stressed. The course is open to clinicians, pathologists, bacteriologists, technicians and others who have an interest in the medical phases of Mycology. Classes meet six days a week from July 5 to July 31.

Inquiries concerning this course should be directed to Dr. Norman F. Conant, Duke Hospital, Durham, North Carolina.

AMERICAN BOARD OF OBSTETRICS AND GYNÆCOLOGY

The next scheduled examinations, Part II (oral and pathological), for all candidates will be held at the Edgewater Beach Hotel, Chicago, Illinois, by the entire Board from May 10 through May 17, 1954. Formal notice of the exact time of each candidate's examination will be sent him several weeks in advance of the examinations.

Requests for Applications for Appraisal of Incomplete Training, Applications for Certification, current Board Bulletins, and Preceptorship or Supplemental Training Forms should be made to: Robert L. Faulkner, M.D., Secretary, American Board of Obstetrics and Gynæcology, 2105 Adelbert Road, Cleveland 6, Ohio.

FEDERAL SUPPORT FOR MONTREAL BLOOD DERIVATIVES RESEARCH

Research at the University of Montreal on blood derivatives is to be supported by a federal grant of $46,220. The Institute, headed by Dr. Armand Frappier, will install and equip a pilot plant in order to be in a position to prepare fractions from blood and to study the activity of such fractions by physio-chemical and biological methods. It will endeavour to improve these blood products to fit them for health uses and to make available to public health authorities any by-products of such research, such as gamma globulin.

(Continued on page 86 of the advertising section)

when other therapy fails

in dry eczema

pruritus

diaper rash

external ulcers

dermatitis
(plant, allergic, chemical)

sunburn
and other burns

dermatoses

apply

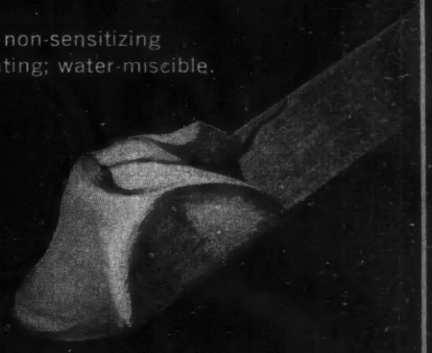
panthoderm cream

the **first** and **only** topical therapy
to contain pantothenylol
(analog of pantothenic acid)

quickly relieves pain and itching

stimulates granulation and healing

Soothing, bland, non-sensitizing
and non-irritating; water-miscible.



In 1 oz., 2 oz.
and 1 lb. jars.

Samples and literature
upon request.

u. s. vitamin corporation of canada, ltd.
1452 Drummond Street • Montreal, Canada

NEWS AND NOTES

(Continued from page 85 of the advertising section)

THE NUTRITION SOCIETY OF GREAT BRITAIN

The Nutrition Society of Great Britain has appointed Prof. E. W. McHenry as Honorary Correspondent for Canada. Membership in the Society is open to Canadians whose work has contributed to the scientific knowledge of nutrition; application forms are now available in Canada. The Nutrition Society holds frequent meetings in Britain and Canadians, interested in nutrition and visiting in Britain, will be welcome at the meetings. Advance information regarding meetings, membership application forms, and information about the Nutrition Society can be obtained from Prof. E. W. McHenry, School of Hygiene, University of Toronto, Toronto 5.

ABO GROUPS IN BLOOD PLATELETS

Suspensions of blood platelets in normal saline are agglutinated by A, B and O sera, just as these sera agglutinate red cells of the corresponding group. It is thus possible to establish four blood groups for platelets, similar to the blood groups in erythrocytes.

Gurevitch and Nelken of Jerusalem report (*Nature*, 173: 356, 1954) that they typed platelets from 40 different bloods; in each case the type corresponded to the erythrocyte grouping.

in pruritus ani et vulvae | *results*

with **Cortef*** brand of hydrocortisone (compound F)

acetate ointment *in 5 Gm. tubes*

Concentrations of 2.5% (25 mg. per Gm.) and 1.0% (10 mg. per Gm.)

Literature available on request *TRADEMARK

Upjohn *Fine pharmaceuticals since 1886*

THE UPJOHN COMPANY OF CANADA, 384 Adelaide Street, West, Toronto

VETERINARY MEDICINE

Veterinary medicine and human medicine are so closely linked that no excuse is really necessary for noticing in these columns the advent of a new journal intended as an international publication on animal medicine. This journal, the *Zentralblatt für Veterinärmedizin*, is published in Berlin under the direction of two veterinarians, Prof. Spörri of Switzerland and Prof. Lerche of Berlin. It is the editorial policy to accept articles in English, French or German, although all articles in the first two numbers are in German with summaries in French, English and in some cases Spanish. An Editorial Board has representatives from most Western European countries.

The first issue contain several papers of interest to workers in human medical research, such as some extensive studies of BCG vaccination of calves with encouraging results, a review of cerebral reticuloendotheliosis in man and animals, a comparative study of cerebrospinal fluid in animals, and a report of experimental work on virulence of *Erysipelothrix rhusiopathiæ*.

The *Zentralblatt für Veterinärmedizin* will appear in annual volumes of about six numbers, each number costing about 23 German marks, and is obtainable from Paul Parey, Berlin SW 68, Lindenstrasse 44-47.

FOCUS ATTENTION ON WORKERS' HEALTH

The Industrial Health Section of the Health League of Canada takes particular interest in plans of the World Medical Association to establish an International Committee on Occupational Health. Advisory committees, representing several nations and mainly comprising industrial health leaders, are now in the process of being set up.

The Health League Committee, under the chairmanship of Dr. Harrison Waddington of Toronto, has specialized in Occupational Health problems in Canada, collecting information from industrial health authorities and disseminating facts to industries and interested laymen through bulletins, promotional material and the magazine *Health*. A number of industries have enrolled their personnels in the Health League under an industrial membership plan in order to increase the scope of this activity.

The announced purpose of the proposed International Committee is to (1) formulate and promulgate standards for better medical and health services to employed groups; (2) prepare a report on the relation of the physician to these major components of industrial health: administrative relationships, health counselling and health education, preventive medicine, workmen's compensation, rehabilitation, medical care and environmental hygiene; (3) meet with representatives of other industrial health groups as the International Labour Organization and the World Health Organization to define specific objectives spheres of action and working relations, and (4) sponsor a discussion at an early session of the World Medical Association, independently or in conjunction with other agencies, to bring into focus its own program with that of existing international bodies.

The W.M.A. is a non-government organization representing 700,000 physicians of 46 national medical societies.